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U. S. DEPARTMENT OF AGRICULTURE

OFFICE OF PUBLIC ROADS—BULLETIN No. 41

LOGAN WALLER PAGE, DIRECTOR

MILEAGE AND COST OF PUBLIC ROADS
IN THE UNITED STATES

IN 1909

BY

J. E. PENNYBACKER, JR.

Chief of Road Management
(to January 1, 1911)

AND

MAURICE O. ELDRIDGE

Assistant in Charge of Road Management
(since January 1, 1911)

FEBRUARY 29, 1912.—Ordered to be printed

OFFICE OF PUBLIC ROADS.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF PUBLIC ROADS,
Washington, D. C., July 31, 1911.

SIR: I have the honor to transmit herewith a manuscript giving the results of an investigation which has just been completed by this office, relating to the mileage and cost of public roads in the United States for the year ending December 31, 1909. The work of compiling this information was carried on by Mr. J. E. Pennybacker, jr., until he left the office on January 1, 1911, and was completed by Mr. M. O. Eldridge, assistant in charge of road management since that time. I respectfully recommend that the document be issued as Bulletin 41 of this office.

Respectfully,

LOGAN WALLER PAGE,
Director.

Hon. JAMES WILSON,
Secretary of Agriculture.

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MILEAGE AND COST OF PUBLIC ROADS IN THE UNITED STATES IN 1909.

INTRODUCTION.

METHOD OF COMPILING STATISTICS.

Bulletin No. 32 of this office, entitled "Public Road Mileage, Revenues and Expenditures in the United States in 1904," has proved so useful that it has been decided to collect and publish similar information from time to time, in order to show what progress is being made in this respect. In pursuance of this plan, the office has just completed the collection and compilation of information showing the mileage of improved and unimproved roads in the United States for the year ending December 31, 1909, and in order to meet the numerous demands for information in regard to the cost of road building, considerable data have also been included on that subject.

It is the purpose of this bulletin to assemble the results of this investigation in such a way as to illustrate the progress in road improvement in the different States for the five-year period from 1904 to 1909. For a more convenient study of the subject and in order that comparisons and deductions may be easily made, the mileage statistics for the various States are presented in Table No. 3 in parallel columns for 1904 and 1909. The progress made by individual counties may be ascertained by comparing the State tables in the appendix with the State tables contained in Bulletin No. 32.

The value and need of accurate road statistics have heretofore been imperfectly understood and consequently only scant records are available in many places. The importance of complete records in regard to expenditures and cost of roads and of a stricter classification of the different kinds of roads has been brought to the attention of every county and township in the United States through these investigations. As a result of this, it is believed that the figures contained in this bulletin are more reliable than those presented in Bulletin No. 32. If the collection of the information contained in these bulletins has no other effect than to induce the local officials to keep more accurate records, it will have served a useful purpose.

The statistics contained in this publication relate to country roads only, except in a few instances where it has been impossible for correspondents to draw the line definitely between country roads and village streets.

The term "improved roads," as used in this bulletin, implies a road which has been graded, drained, and surfaced with a hard mate-

rial or a combination of materials, or to which some preparation has been applied, resulting in a reasonably smooth, firm, and durable surface. Macadam or gravel roads may be cited as examples of hard material applied to earth subgrades; the sand-clay road and bituminous macadam are good examples of the application of combinations of materials to effect the desired result, while the use of oil, tar, and other bitumens, principally on macadam roads, though occasionally on earth roads, illustrates the improvement of a road by the application of preparations.

SOURCES OF INFORMATION.

The information contained in this bulletin has been secured by correspondence, principally with road officials and partly with private citizens of the various States and Territories, counties, townships, districts, and other civil subdivisions of the United States. In many cases, the information was obtained from voluntary county correspondents appointed by this office for the purpose, but in almost every case these correspondents were either road officials or the best informed private citizens in road matters in their respective communities.

The magnitude of this task may be appreciated when it is understood that there are in the United States about 150,000 State, county, and local road officials, and that it was necessary to correspond with most of these in order to secure the desired information. In many cases it was necessary to write a number of individual letters to township and other local road officials before the information could be secured.

Every possible effort has been made to verify the accuracy of the figures given in the tables. When there was any doubt as to the correctness of the figures given, they were returned for correction or approval to the person from whom they were received, or to some other person qualified to give correct information. Upon the completion of the tabulations for the various States, they were submitted to the heads of the State highway departments or geological surveys, or to some well-informed person in the State for correction and approval.

The total mileage statistics are based mainly on approximations or estimates from the various civil subdivisions of the United States, as there are very few States or counties where the roads have been actually surveyed and measured, and it will be impossible to secure accurate data in regard to total mileage until this has been done. The statistics in regard to the mileage of improved roads are based more nearly on facts than on estimates, although in many cases the mileage of improved roads was estimated.

It is quite possible, therefore, that, in spite of the precautions which have been taken, some errors have crept in. The total mileage, as well as the mileage of improved roads, may be in some instances overestimated, and in others underestimated. In view of these facts, the office can not vouch for the absolute accuracy of all of the figures given in the tables, but it is believed that, taken as a whole, they can be accepted as a fairly accurate record on which to base the progress of road building in the various States during the five-year period treated.

MILEAGE OF PUBLIC ROADS.

Table No. 3 of the appendix, in which the road statistics for all the States and Territories are given, shows that at the close of 1909 there were 2,199,645.14 miles of public roads in the United States, which exceeds the mileage reported for 1904 by 48,266.14 miles. This tabulation includes the same States and Territories as those reported in 1904, with the following exceptions: The District of Columbia has been eliminated on account of the fact that there are no roads in it which should be classified as country roads. Indian Territory and Oklahoma have, since 1904, been combined to form the State of Oklahoma and a large number of counties have been organized from which it was impossible to secure reports in 1904. This has had the effect of increasing the total mileage of Oklahoma from 43,554 in 1904 to 71,325 in 1909. A number of new counties have been organized since 1904 in the Middle and far Western States, which has had the effect of increasing the total mileage in those States. Mileage statistics are not included for Alaska, Porto Rico, Hawaii, the Philippines, or Guam. The mileage of roads given in the tables does not include the streets or boulevards in incorporated cities or villages.

Of the total mileage of public roads in the United States at the close of 1909, 102,870.44 miles were surfaced with gravel, 59,237.35 miles with stone, and 28,372.52 with other materials, which makes a total of 190,476.32 miles of improved roads.

By comparing these figures with those collected for 1904, it will be seen that the total mileage of gravel roads reported has decreased by 7,034.66 miles. This is due principally to the fact that in 1904 no information was collected in regard to sand-clay roads, except from the Southeastern States, and it is quite probable that a number of the roads which were reported as gravel roads in 1904 were reported in 1909 as sand-clay roads. This discrepancy is also partly accounted for by reason of a reclassification of the roads in several of the States, by which many of the poorly built and poorly maintained gravel roads have been eliminated from the improved road class. An effort was made in this investigation to exclude all natural gravel roads from the improved class unless they were well graded and drained, but many of these were included in the 1904 statistics.

The total mileage of stone roads has increased from 36,818.4 in 1904 to 59,237.35 in 1909. The mileage of roads surfaced with other materials, including sand-clay, shells, bituminous-macadam, brick, etc., has increased from 6,806.8 miles in 1904 to 28,372.52 miles in 1909.

MILEAGE OF IMPROVED ROADS.

Indiana still leads all other States in total mileage of improved roads with 24,955.75 miles; Ohio still occupies the second place with 24,106 miles; New York is third with 12,787.36 miles; Wisconsin fourth with 10,167.33 miles; Kentucky fifth with 10,114.95 miles; Illinois sixth with 8,914 miles; California seventh with 8,587.75 miles; and Massachusetts eighth with 8,463.18 miles.

The greatest progress in road improvement has been made in the State of New York, which has increased its mileage of improved roads from 5,876 in 1904 to 12,787.36 in 1909 (6,911.36 miles), due partly to the fact that New York has been spending about \$5,000,000 a year from a \$50,000,000 State bond issue on trunk-line highways, in addi-

tion to the regular annual expenditures from local revenues of about \$5,000,000.

The notable increases in the total mileage of improved roads for the five-year period 1904-1909 are shown as follows: Georgia from 1,634 to 5,978 (4,344 miles); Washington from 1,976.5 to 4,520.68 (2,544.18 miles); Missouri from 2,733 to 4,755.5 (2,022.5 miles); South Carolina from 1,878 to 3,534.75 (1,656.75 miles); Alabama from 1,720 to 3,263.93 (1,543.93 miles); Pennsylvania from 2,160.78 to 3,364.76 (1,194.98 miles); Tennessee from 4,285 to 5,353.5 (1,068.5 miles); New Jersey from 2,422.3 to 3,377.86 (955.56 miles); Florida from 885.5 to 1,752.35 (866.85 miles); and Maryland from 1,570 to 2,142.3 (572.3 miles).

A decrease in improved roads is reported from California, Michigan, Minnesota, and Wisconsin. This decrease may be explained as follows: The practice of improving the earth roads by the use of oil in California has been, to a large extent, discontinued, and this has had the effect of cutting down the mileage of that class of roads considerably and so of reducing the total mileage of improved roads. In Michigan and Minnesota the roads have been reclassified by the State highway departments and the mileage of roads which come under the improved class has been reduced. In Wisconsin the mileage of both stone and gravel roads is a little less than was reported in 1904, owing probably to a more careful classification of the roads than it was possible to make at that time. A reclassification of the roads is also responsible for the decrease in gravel roads in Connecticut, Indiana, Massachusetts, Ohio, Oregon, Utah, and Virginia.

In no other class of improved roads has the mileage increased so rapidly during the five-year period as in the case of sand-clay roads. The sand-clay construction consists of mixing sand and clay together in such a way as to produce a road which does not become muddy, and which remains comparatively firm during wet or dry weather. This method of construction is confined principally to the Southeastern States, although it is now being used to some extent in the Gulf Coast and Middle Western States. The progress in this class of construction for the five-year period is shown in Table 4.

From this table it will be seen that the mileage of sand-clay roads has increased from 2,979 in 1904 to 24,601.42 in 1909. Alabama has increased her mileage of sand-clay roads from 12 in 1904 to 1,107 in 1909; Georgia from 513 to 4,326.5 during the same period; and South Carolina from 1,575 to 3,218 in the same length of time. A large mileage of sand-clay roads is shown for Michigan, Washington, and Wisconsin, but it is believed that these are not all new roads, but simply roads which were reported as gravel roads in 1904.

PERCENTAGE OF ROADS IMPROVED.

It will be seen from Table 3 that, at the close of 1909, 8.66 per cent of the roads in the United States were improved, representing a gain in the total road mileage improved for the five-year period, 1904-1909, of 1.52 per cent, or, in other words, the percentage of improved roads has increased during this period from 7.14 to 8.66 per cent.

Rhode Island occupies the first place in the percentage of roads improved, having, as it does, 49.14 per cent; Massachusetts comes next with 49 per cent; and then follow Indiana, 36.7; Ohio,

27.13; Connecticut, 24.08; New Jersey, 22.76; Kentucky, 18.82; Vermont, 18.40; California, 17.87; Wisconsin, 16.64; New York, 16.13; Washington, 13.19; Maryland, 12.77; Utah, 12.23; Tennessee, 11.66; South Carolina, 11.02; Maine, 10.59; and Michigan, 10.01 per cent.

The following States have between 5 and 10 per cent of the roads improved: Alabama, Delaware, Florida, Georgia, Illinois, Minnesota, New Hampshire, and Oregon. There are 22 States which have less than 5 per cent of the roads improved.

COST OF ROAD BUILDING IN VARIOUS STATES.

The cost of road building depends upon a number of factors, the most important of which are the cost of grading, the value of labor and teams, the availability and kinds of materials, the method of construction, the cost of bridges and culverts, the character of the soil and the traffic, the method of supervision, and, to a certain extent, the climatic conditions. There are very few localities in the United States where all these factors are exactly alike, and consequently there are but few places where the cost of road building would be the same, even though the same type of construction be employed. Comparisons of the average cost of roads in two localities are of little value, therefore, unless all the conditions are taken into account.

In many parts of the United States the land is so level that no grading is necessary, except to prepare the foundation to receive the materials and to provide suitable ditches to dispose of surface drainage; but in other sections the cost of grading and the cost of bridges, culverts, and retaining walls often amounts to more than the cost of surfacing.

In the Southern States the cost of labor for road work ranges from 75 cents to \$1.25 per day, while the cost of double teams with driver ranges from \$2.50 to \$4 per day. In the North and West, however, laborers receive from \$1.50 to \$2 per day for this class of work, while the prices paid for double teams with drivers range from \$3.50 to \$5 per day. This partly accounts for the fact that roads of the same type frequently cost more in the North and West than in the Southern States, where the cost of labor is generally low.

The distance that road materials have to be hauled determines, to a large extent, the cost of the work. In many parts of the country material is so plentiful that the average haul does not exceed 1 or 2 miles, while in other parts of the country materials have to be transported long distances by rail or water and then hauled several miles by country road. This factor alone very frequently affects the cost to such an extent that a macadam or gravel road will cost considerably more in one part of a county than the same kind of a road will cost in another part of the same county.

In rolling and mountainous sections of the country the cost of bridges and culverts frequently amounts to as much as the cost of surfacing, whereas in level regions and especially where the rainfall is light this item of expense is very small.

At times the temperature falls as low as from 40° to 50° F. below zero in certain parts of the Northern States, while there are many places on the Pacific Coast and in the Southern States where the temperature rarely falls below the freezing point. It is obvious, there-

fore, that heavier and more expensive types of road are required in regions where the ground freezes several feet below the surface than in those sections where the ground is seldom frozen. The annual rainfall ranges all the way from 8 to 10 inches in Arizona, California, Colorado, Nevada, and northwest Texas to from 50 to 60 inches in parts of Florida, Alabama, Georgia, Mississippi, Louisiana, Tennessee, Arkansas, and southeast Texas. The rainfall, as much as any other factor, affects the condition of the road and, while good earth and gravel roads often give entire satisfaction where the rainfall is light, a more durable and expensive type of road must be built where the rainfall is heavier. If the rainfall is light, however, and the traffic is heavy, as is the case in many of the arid regions of the West, special treatment for laying the dust and preserving the surface with oil and other preparations sometimes becomes necessary.

The condition of the soil also affects the cost of road building. For instance, on sandy loams and gravelly soils 4-inch macadam roads are being successfully built and maintained in many parts of the country. In other localities it has been found necessary to macadamize to a depth of from 8 to 10 inches on certain types of clay soils and fine silt loams, while sometimes the Telford method of construction, or the V-shaped drain foundation must be resorted to in order to obtain a solid and durable road. One of the most important factors affecting the cost is that of the traffic. A road which would be satisfactory for light carriage traffic would not always be suitable for heavy wagon traffic and, on the other hand, a road which would be satisfactory for heavy, horse-drawn, steel-tired traffic would not be, as a general rule, suitable for fast automobile traffic. The character and cost of construction is therefore largely determined by the traffic to which the road is subjected.

Table 5 presents a summary of the information secured from the various States in regard to the cost of four of the standard types of construction, i. e., sand-clay, gravel, macadam, and bituminous macadam. Details as to the width and depth are given in the appendix. Information will also be found in the appendix in regard to the special types of construction, such as shell roads, brick roads, etc.

It was impossible to obtain cost data from Illinois, as all information contained in this bulletin relating to that State was secured from the State highway department, which was unable to furnish any cost data, and it was too late, when this fact became known, to collect the information from the various counties and townships.

The cost data obtained from Arizona, Idaho, Iowa, Nevada, New Mexico, North Dakota, South Dakota, and Wyoming were so meager as to be of little value, and are therefore not included.

No information is given for the District of Columbia, as there are no roads in the District which would be classed as country roads.

It will be seen from the tables that the cost of gravel roads is greater in Maine, New Hampshire, and Connecticut than in Indiana, Ohio, and Minnesota. In the States last named the statute labor tax is still used, and many of the gravel roads are built by farmers in working out their tax, while in the States first named the standard of construction is much higher and all road taxes are paid in cash.

It is believed that the figures given in the summary represent approximately the average cost of road building in the respective States, as they are based upon reports received in regard to the

actual cost of road building. Some of the county and township reports are based on one section of road only, but most of them are based on the average cost of construction in the county or township from which the report was received.

In sending out queries in regard to the cost of road building, correspondents were requested to give the cost per mile or per square yard. It is obvious that this information would be more useful, especially to engineers, if the returns were expressed in cost per square yard instead of cost per mile; but, as most of the correspondents stated the cost per mile, it is so given in the summary, although in the State tables considerable data are presented showing the cost of the various types by the square yard.

The cost of large bridges and extraordinary construction, such as retaining walls, etc., is not included, except in a few instances, but the cost of small bridges and all ordinary construction, including surface drainage, is included.

The average cost of the four types of construction referred to in the summary, Table 5 of the appendix, is as follows: The average cost of sand-clay roads for the 17 States from which reports were received is \$723 per mile, the average width of surface treated 17 feet, and the average depth of the material 9 inches. It will be noticed that there are quite a number of States for which no report is given. This is due to the fact that the sand-clay method is adapted only to certain portions of the country where the soil and climatic conditions are favorable to its construction. This method of road building seems to be peculiarly adapted to the States embraced in the Atlantic Coastal Plain, although it has been used to some extent in the Middle Western States. In the Middle West, however, this method is still in the experimental stage.¹

The average cost of gravel roads for the 31 States from which reports were received is \$2,047 per mile. The average width of gravel surface is 13 feet and the average depth of the material 7 inches.

The average cost of macadam roads for the 34 States from which reports were received is \$4,989 per mile. The average width of macadam surface is 13 feet and the average depth of the material 6 inches.

In view of the fact that the mileage of poorly built macadam, gravel, and sand-clay roads exceeds the mileage of properly constructed roads of the same types, the above figures should not be used as a basis of comparison in communities where the roads are being built according to the latest and most approved methods, for it is safe to say that in such places the cost will considerably exceed the average given above. A better idea of the cost may be gained by a study of the maximum and minimum cost shown in the State tables in the Appendix.

The average cost of bituminous-macadam roads for the 10 States from which reports were received is \$10,348 per mile for roads surfaced to a width of 15 feet and to a depth of 6 inches. The information received in regard to bituminous construction, however, is rather meager, and it is believed that it does not represent the average cost of country roads, as do the figures in regard to other methods

¹ See U. S. Dept. Agr., Office of Public Roads Circular 91.

of construction. The reason for this is that this method of construction is new and to some extent experimental. Furthermore, bituminous macadam roads have, up to the present time, been built only in the neighborhood of the larger cities, where the cost of labor is comparatively high, and where the roads would naturally be surfaced to a greater width than the roads farther out in the country. It is believed, therefore, that the cost is greater than will be the case when this method of construction becomes more general and when this type of road building becomes standardized.

EXPLANATION AND ANALYSIS OF MILEAGE AND COST STATISTICS.

In order that the mileage and cost tables contained in the appendix of this bulletin may be better understood, the following digest has been prepared for each State:

ALABAMA.

MILEAGE DATA.

The information for Alabama was received principally from the county surveyors, the probate judges, and the clerks of the circuit courts of the various counties. When complete reports from each county had been received, they were submitted to Dr. William F. Prouty, assistant State geologist, who verified them.

According to Table 6 there were at the close of 1909, 49,639 miles of public roads. The total mileage in 1904 was 50,089. This discrepancy is probably due to the fact that the mileage for some of the counties was slightly overestimated in 1904. Of the 49,639 miles of public roads, 683.5 miles are reported surfaced with stone, 1,398.43 miles with gravel, 1,107 miles with sand-clay, and 75 miles with shell, making a total of 3,263.93 miles of improved roads for 1909 as against 1,720 miles in 1904. There were no sand-clay roads reported in 1904, but the improved roads in the State at that time represented 3.43 per cent. This would indicate that 3.15 per cent of the roads of Alabama were improved between 1904 and 1909.

By referring to Table 6, it will be seen that 31 counties report no roads improved, 17 counties report less than 10 per cent improved, 11 counties report from 10 to 19 per cent improved, 4 counties report from 20 to 29 per cent improved, and 4 counties report 39 per cent and over improved, namely, Baldwin, 39; Cherokee, 50; Montgomery, 52.41; and Madison, 68.33 per cent.

COST DATA.

The cost of earth roads in Alabama, as shown by Table 7, varies from \$175 to \$300 per mile, and the average for the three counties reporting is \$225 per mile. This evidently represents the cost of ordinary surface drainage and shaping, and does not include heavy cuts and fills or rock excavations.

The cost of sand-clay roads varies from \$400 to \$1,350 per mile and the average for the 6 counties reporting is \$680 per mile. The width of the sand-clay road surface varies from 16 to 30 feet, with an average of about 23 feet.

Gravel roads cost from \$500 to \$4,950 per mile and the average for the 6 counties reporting is \$1,483 per mile. The average width of gravel-road surface is 16 feet.

Macadam roads cost from \$1,500 to \$3,600 per mile with an average for the 4 counties reporting of \$2,525 per mile. This is a rather low cost for macadam construction, but the reports indicate that the roads are surfaced to a width of only about 10 feet. Only 1 county, Jefferson, reports on the cost of bituminous construction and the cost for the 1 mile upon which the report is based is \$13,250.

ARIZONA.

MILEAGE DATA.

The clerks of the boards of supervisors and the county superintendents of roads furnished the information contained in Table 8. The returns were checked up by Mr. J. B. Girand, territorial engineer.

According to Table 8, there were, at the close of 1909, 5,987 miles of public roads in Arizona—the same mileage as reported for 1904. Of the mileage as given for 1909, 248 miles were reported as surfaced with gravel and 25 miles with sand-clay, making a total of 273 miles of improved roads as against 217 miles in 1904. From the figures it appears that 4.56 per cent of the roads of the State were improved at the close of 1909. The percentage of improved roads in 1904 was 3.62 per cent, which shows a gain for the five-year period of only 0.94 per cent. Only 5 counties in the State report no improved roads, while 6 counties report less than 10 per cent and 2 counties report more than 10 per cent improved, namely, Apache, 12.5, and Yuma, 19.68 per cent.

ARKANSAS.

MILEAGE DATA.

The information contained in Table 9 was received principally from county judges and county clerks. When complete information had been received from each county, the reports were submitted to the State geologist, who verified them.

According to Table 9, there were, at the close of 1909, 36,445 miles of public roads in the State. The total mileage in 1904 was the same as that given for 1909. Of the total mileage for 1909, 170 miles were reported surfaced with stone, 537.25 with gravel, and 378 miles with sand-clay, making a total of 1,085.25 miles of improved roads. There were no sand-clay roads reported for 1904. The total mileage of improved roads reported for 1904 was 236, which shows a gain of 849.25 miles for the five-year period, 1904 to 1909. It appears from these figures that 2.97 per cent of the roads of Arkansas were improved at the close of 1909, whereas in 1904 only 0.64 per cent were reported improved, which indicates a gain of 2.33 per cent for this period.

Forty-five counties report no improved roads, 22 counties report less than 10 per cent improved, 6 counties report between 10 and 19 per cent improved, while 1 county, Craighead, reports 22.85 per cent improved, and 1 county, Pulaski, reports 61.23 per cent improved.

COST DATA.

Cost data for earth, gravel, and macadam roads in Arkansas are shown in Table 10.

Only 2 counties reported on the cost of earth roads, and the average was \$225, which includes only ordinary surfacing and draining.

The average cost of gravel roads for the 6 counties reporting is \$940 per mile, but it varies from \$350 to \$3,000 per mile. The average width of graveled surface is about 10 feet.

The cost of macadam construction varies from \$1,000 to \$6,000 per mile in the 4 counties reporting, with an average of \$3,250. The average width of the surface is 17 feet. While \$6,000 is considered a little high for macadam construction in Arkansas, \$1,000 is too low. It is quite evident that only the crudest sort of macadam road can be built in that State for that price, even though materials are plentiful and labor is cheap.

CALIFORNIA.

MILEAGE DATA.

The mileage statistics for California were secured from the surveyors, auditors, and clerks of the various counties. Mr. Nathaniel Ellery, State engineer of California, rendered valuable assistance in securing part of the information and in checking up the final returns. The information for some of the counties is not altogether satisfactory, but the figures are as accurate and complete as it was possible to obtain at this time.

As will be seen from Table 11, California had, at the close of 1909, 48,069 miles of public roads, which exceeds the total mileage reported for 1904 by 1,416 miles. This gain in total mileage is probably due to the fact that a more careful classification of the roads has been made than it was possible to make in 1904.

Of the total mileage of public roads in the State, 579.25 miles are reported as having been surfaced with stone, 6,054 miles with gravel, 1,289 miles with sand-clay, and 653 miles with oiled earth, making a total mileage of improved roads of 8,587.75 or 17.87 per cent. This is about 1 per cent less than was reported for 1904, and this decrease is due principally to the fact that the oiling of earth roads has been abandoned to a large extent, for, while there were 2,541 miles of earth roads reported as having been oiled in 1904, there were only 653 miles of oiled roads reported for 1909.

The gain in improved roads is as follows: 160.75 miles of macadam, 210.5 miles of gravel, and 1,289 miles of sand-clay. No sand-clay roads were reported in 1904. There are 10 counties in the State which report no improved roads, 21 counties have less than

10 per cent improved, 10 counties have between 10 and 19 per cent improved, 2 counties have from 20 to 30 per cent improved, 6 counties have from 30 to 39 per cent improved, and 9 counties have from 52 to 80 per cent improved, as follows: Colusa, 52.24; Alameda, 55.55; Yolo, 57.72; Sonoma, 59.92; San Mateo, 65.14; San Benito, 68.73; Santa Clara, 68.83; Los Angeles, 72.33; and Napa, 80.89 per cent.

COST DATA.

The types of improved roads ordinarily built in California are sand-clay, gravel, macadam, and bituminous macadam. Cost data in regard to these types of construction are shown in Table 12.

Only 2 counties reported on the cost of sand-clay roads, with an average of \$412, while the average width is 17 feet.

Twelve counties furnish information in regard to the cost of gravel roads. Six counties report the cost by the mile, five by the square yard, and one, Glenn, by the cubic yard. The average cost of the counties reporting by the mile is \$1,375, and that of the counties reporting by the square yard is 69 cents. The cost in Glenn County is given as 89 cents per cubic yard. The average width of the gravel roads is about 13 feet.

Nine counties report on the cost of macadam construction, 4 by the mile and 5 by the square yard. The average cost per mile for the counties reporting is \$5,375, while the average cost per square yard is \$1.08. The average width of the macadam roads is 17 feet.

Seven counties report the cost of bituminous macadam, 3 by the square yard and 4 by the mile. The average cost per square yard is about \$1.39 and by the mile \$8,575. The width of the bituminous surface is 17 feet.

COLORADO.

MILEAGE DATA.

The mileage statistics for Colorado were secured from the county clerks and checked up by Mr. J. E. Maloney, secretary of the State highway commission and special agent of this office. In addition to checking up the returns, Mr. Maloney also rendered valuable service in furnishing information regarding the correct mileage of public roads in the various counties.

The total mileage of all public roads reported for 1909 was 29,693 (Table 13) as compared with 30,214 miles for 1904. There were 320.5 miles of improved roads reported, of which 14 are macadam and 306.5 gravel. The mileage of macadam roads reported for 1909 is less by 43 miles than was reported in 1904, but the mileage of gravel roads is 185.5 miles greater. It will be seen that 1.08 per cent of the roads are improved, which shows a gain for the five-year period from 1904 to 1909 of 0.49 per cent. There are 43 counties in the State which reported no improved roads, while the remainder of the counties, 17 in number, reported less than 10 per cent improved.

Colorado has made greater progress in road improvement than is indicated by these returns. Owing to the light traffic and dry climate, the natural earth roads, if placed on proper grades and provided with suitable culverts and bridges, are satisfactory for all ordinary purposes, and there are many miles of well-graded mountain roads in Colorado which are not included in the total of improved roads.

COST DATA.

As will be seen from Table 14, only 2 counties report on the cost of earth roads, and the average is \$600 per mile.

Summit County reports the cost of sand-clay roads to be about \$300 per mile.

Four counties report on the cost of gravel roads, with a minimum cost of \$700 and a maximum cost of \$2,000, while the average is \$1,475.

CONNECTICUT.

MILEAGE DATA.

Mileage statistics for Connecticut were secured from the selectmen of the various towns, but there were so many towns from which no information could be obtained and where the information furnished was so unsatisfactory that Mr. C. G. Nichols, who is a special agent of this office and who is also connected with the State highway department, was requested to correspond with the various towns and collect such information as was necessary to complete the report.

Table 15 shows the results of Mr. Nichols's investigations, and the information contained therein is as complete and accurate as it is possible to obtain.

According to this report there are in the State 12,583 miles of public roads, which is 1,505 miles less than was reported in 1904. Of the improved roads, 665.62 miles are reported as surfaced with stone, 774.4 with gravel, 1,214.25 with sand-clay, and 376.27 as specially improved earth roads, making a total of 3,030.54 miles of improved roads, which represents 24.08 per cent of the total, or a gain of 7.33 per cent for the five-year period from 1904 to 1909. The gain in stone roads for this period is 202.12 miles; of sand-clay roads, 1,214.25; and of specially improved earth roads, 376.27.

There is a decrease of a little over 1,100 miles of gravel roads for the five-year period, but this is probably due to a reclassification of the roads. It is quite evident that many of the roads which were reported as sand-clay roads in 1909 were reported as gravel roads in 1904. The specially improved earth roads are surfaced with the best available soil, which usually contains gravel or sand. These roads are graded, provided with bridges and culverts, and are practically as good as the sand-clay and gravel roads, and should therefore be included as improved roads, although earth roads are not ordinarily placed under this classification.

Every county in the State reports some improved roads, and there is only one county with less than 10 per cent of the roads improved. Three counties have from 14 to 19 per cent improved, while those having a still larger percentage are Windham, 26.54; Fairfield, 27.58; Middlesex, 37.32; and Hartford, 44.66 per cent. Fairfield County reports 605.42 miles and Hartford County 796.39 miles of improved roads.

COST DATA.

Information contained in Table 16 was secured from the biennial report of the State highway commission for the years 1907 and 1908.

The figures given in the table represent the cost of roads built under the direction of the State highway department, for which the State paid from three-fourths to seven-eighths of the cost.

The average cost of gravel roads for the 22 townships reporting was \$5,411.77 per mile. The average width of the gravel roads is 14 feet and the average depth of material 8 inches.

The average cost of macadam construction for the 50 sections of road shown in the table is \$8,219.60 per mile, while the average width of macadam is 14 feet and the average depth 7 inches.

The average cost of the telford roads for the 48 sections referred to in the table is \$10,254.87 per mile, the average width 14 feet, and the average depth of material 13 inches. The telford roads are of two kinds—those surfaced with crushed stone and those surfaced with gravel. The average cost of the 34 macadam telford roads shown in the table is \$11,322 per mile, while the average cost of the gravel telford construction for the 14 sections of road referred to is \$7,659 per mile.

DELAWARE.

MILEAGE DATA.

The information for Delaware was secured from the county road commissioners and from Mr. Francis A. Price, State highway engineer for New Castle County. The total of all public roads for 1909 was reported as 3,000 miles (Table 17), which is the same as that reported for 1904. Of this amount, 96.36 miles are reported as having been surfaced with stone, 49 miles with gravel, 6,075 miles with sand-clay, and 35 miles with shells, making a total of 186.44 miles improved, which represents 6.22 per cent of the total.

The gain in improved roads for the five-year period 1904 to 1909 was as follows: 82.36 miles of stone roads, 47 miles of gravel, and 6.07 miles of sand-clay roads. A reduction of 15 miles was reported in the shell roads. The total gain in improved roads for the five-year period is 120.44 miles, or 4.02 per cent. Kent County reports no improved roads, but New Castle County reports 10.24 and Sussex County 7.63 per cent improved.

COST DATA.

The cost of macadam roads (Table 18) in New Castle County, built of different materials, is as follows: Limestone, 12 feet wide and 6 inches deep, \$6,150; granite, 13 feet wide and 7 inches deep, \$6,900; trap rock, 12 feet wide and 6 inches deep, \$7,500; average for the three types, \$6,850.

The average cost of bituminous construction in New Castle County is \$10,120. The average width of the road is 12 feet and the average depth 6 inches.

Sussex County reports that sand-clay roads are being built for 15 cents per square yard and that gravel roads are costing about 25 cents per square yard.

No report was received from Kent County.

FLORIDA.

MILEAGE DATA.

Information regarding the mileage of improved roads in Florida was obtained from the county judges, the clerks of the circuit courts, and the road supervisors of the various counties. The reports were then submitted to Mr. E. H. Sellards, State geologist, who verified them.

According to the data contained in Table 19, there were at the close of 1909, 17,579 miles of public roads in the State. Statistics collected from the same source in 1904 showed the total mileage of public roads to be 17,374. This would indicate that the total mileage for 1909 exceeds the total for 1904 by 205 miles.

Of the total mileage of public roads in Florida for 1909, 278.25 miles are reported surfaced with stone, 259.6 with gravel, 1,016.5 with sand-clay, and 198 miles with shells, making a total of 1,752.35 miles of improved roads, or an increase over 1904 of 879.35 miles.

The gain in improved roads of the various classes for the five-year period is as follows: 242.1 miles of gravel, 581.5 miles of sand-clay, and 110 miles of shell. A decrease in the stone-road mileage amounting to 66.75 miles is shown for the five-year period. Only 17.5 miles of gravel roads were reported for 1904, and it is quite probable that this accounts for the decrease in stone-road mileage, as some of the correspondents may have reported roads as surfaced with stone in 1904 which ought to have been reported as gravel roads.

It appears from these figures that 9.97 per cent of the roads of Florida were improved at the close of 1909. According to statistics collected in 1904, the improved roads in the State represented 5.10 per cent, which would indicate that 4.87 per cent of the roads of Florida were improved between 1904 and 1909. In other words, Florida has practically doubled her mileage of improved roads in this five-year period.

By referring to Table 19, it will be seen that 1 county, Monroe, has no county roads, while 18 other counties have reported no roads improved; 16 counties report less than 10 per cent improved, 2 counties report from 10 to 19 per cent improved, and 9 counties report over 20 per cent improved, namely, St. Lucie, 22.5; Orange, 32.85; Leon, 33.33; Escambia, 46.15; Citrus, 56; Dade, 60; Marion, 60; Lake, 64.87; and Volusia, 72 per cent.

COST DATA.

The average cost of roads of different types in Florida is shown in Table 20. Seven counties report in regard to the cost of earth roads. The minimum cost given is \$300 and the maximum \$1,200, while the average is \$786.

Six counties report the cost of sand-clay roads. The minimum cost is \$550 and the maximum \$1,000, while the average is \$829. The average width of the sand-clay roads is about 15 feet, with a depth of about 8 inches.

Three counties report the cost of gravel roads. The minimum cost of this type is \$1,700 and the maximum \$6,500, with an average of \$3,900. The average width of gravel roads is 17 feet. The county reporting the cost of a gravel road as \$6,500 per mile is Duval, of which Jacksonville is the county seat.

Seven counties report on the cost of shell roads. The minimum cost is \$800 and the maximum \$6,500, with an average cost for the counties reporting of \$3,186, and an average width of about 10 feet. The county reporting the highest cost of shell roads is Duval.

Eight counties report the cost of marl rock roads, with a minimum cost of \$1,000, a maximum cost of \$8,000, and an average of \$3,112.

Duval County has also constructed some cement roads at a cost of about \$10,000 per mile, and in Lake County roads have been improved by spreading pine needles over the sand roads at a cost of about \$35 per mile.

GEORGIA.

MILEAGE DATA.

The mileage statistics for Georgia were secured principally from the clerks of the county commissioners, the ordinaries, the superintendents of public roads, and the commissioners of roads and revenues of the various counties. The reports were then verified by the State geologist, Prof. W. S. McCallie.

According to Table 21 there were, at the close of 1909, 82,230 miles of public roads. In 1904 data collected from the same source indicated that the total mileage of public roads of Georgia was 57,203, but this was clearly underestimated and it is believed that the 1909 figures are more nearly correct. Of the total mileage of public roads in the

State in 1909, 880.5 miles are reported surfaced with gravel, 4,326.5 with sand-clay, 522 with stone, 244 with shell, and 5 with bituminous-macadam, making a total of 5,978 miles of improved roads. The gain in improved roads of the various classes for the 5-year period is as follows: 221.5 miles of gravel, 3,813.5 miles of sand-clay, 84 miles of stone, 220 miles of shell, and 5 miles of bituminous-macadam, making a total gain for this period of 4,344 miles.

It appears from these figures that 7.27 per cent of the roads of Georgia were improved at the close of 1909. According to statistics collected in 1904, the improved roads in the State represented 2.86 per cent, which would indicate that 4.41 per cent of the roads of Georgia were improved between 1904 and 1909. In other words, Georgia has increased her mileage of improved roads during the five-year period by about 275 per cent.

Fifty-four counties in Georgia report no improved roads, 52 counties report less than 10 per cent improved, 21 counties report from 10 to 19 per cent improved, 8 counties report from 20 to 29 per cent improved, while 11 counties report 30 per cent and over improved. These 11 counties are as follows: Coweta, 30; Muscogee, 32.75; Jones, 33.33; Clarke, 37.41; Walker, 41.56; Irwin, 45.71; Chatham, 49.09; Crisp, 55.55; Dougherty, 61.71; Fulton, 76.25; and Glynn, 76.5 per cent.

COST DATA.

The cost of the various types of roads built in Georgia is shown in Table 22.

Eight counties report on the cost of earth roads. The minimum cost given was \$200 and the maximum \$1,500, with an average of \$700. The average width of these earth roads between ditches is about 28 feet.

There are 38 counties in the State which reported on the cost of sand-clay roads. The cost varies from \$100 to \$1,200 per mile, with an average cost of \$387. The average width of the sand-clay roads between ditches is about 27 feet.

Nine counties furnished information regarding the cost of gravel roads, which varies from \$200 to \$3,500, and the average is \$1,250. The highest cost of gravel roads is reported for Chatham County, but the material for these roads is shipped from near Augusta by rail.

Nine counties report on the cost of macadam construction, and the cost given varies from \$1,000 to \$5,000, with an average of \$2,275.

Fulton County reports the average cost of macadam construction to be 33 cents per square yard. This county also reports the average cost of bituminous macadam to be about \$1.25 per square yard.

IDAHO.

MILEAGE DATA.

Mileage statistics for Idaho for 1909 were secured from the county auditors and county clerks of the various counties. The information was then submitted to the State engineer for verification.

The total mileage of public roads in the State at the close of 1909, as shown in Table 23, was 18,403, which exceeds the total reported for 1904 by 240 miles. Of this total, 17 miles are reported as having been surfaced with stone, 95.5 miles with gravel, and 398 miles with sand-clay, making a total of 510.5 miles of improved roads, which exceeds the 1904 figures by 298.5 miles. The mileage of stone roads was the same in 1909 as in 1904. There were 99.5 miles less of gravel roads reported for 1909 than for 1904, whereas there were 398 miles of sand-clay roads reported for 1909, while no sand-clay roads were reported for 1904. This discrepancy is probably due to the fact that some of the roads which were reported as gravel roads in 1904 were classified as sand-clay roads in 1909. In 1904, 1.16 per cent of the roads of the State were reported as having been improved, but the percentage for 1909 is 2.77, which shows a gain of 1.61 per cent, or practically double the percentage for 1904.

It will be seen from Table 23 that 13 counties report no improved roads, and 7 counties report less than 10 per cent, while Bear Lake County reports 33.33; Shoshone, 57.5; and Kootenai, 60 per cent improved.

ILLINOIS.

MILEAGE DATA.

Mileage statistics for Illinois were secured from Mr. A. N. Johnson, State highway engineer.

The total road mileage, as shown in Table 24, is the same as that reported for 1904, that is, 94,141 miles. Of this mileage, 8,914 miles were reported improved at the close

of 1909, which exceeds the total for 1904 by 1,008 miles. This total includes both gravel and stone roads.

It appears from these figures that 9.47 per cent of the roads of Illinois were improved at the close of 1909, which exceeds the 1904 mileage by 1.05 per cent. Twenty-five counties report no improved roads, 52 counties report less than 10 per cent improved, and 12 counties report from 10 to 19 per cent improved. The counties having over 20 per cent improved are as follows: Peoria, 22.99; La Salle, 26.73; Will, 26.72; Bureau, 31.01; Lake, 37.24; Dekalb, 37.86; Winnebago, 43.28; Boone, 48.82; Kendall, 51.13; Cook, 56.41; Dupage, 68.36; McHenry, 68.78; and Kane, 82.38 per cent.

INDIANA.

MILEAGE DATA.

The information contained in Table 25 was secured from the county auditors, county engineers, and the township trustees; information regarding the county roads was secured from county officials and that for the township roads from the trustees. Since Indiana has no State highway department, it was impossible to find anyone in the State sufficiently familiar with road conditions to verify the returns. It is quite evident that the mileage of improved roads is overestimated in some counties and is underestimated in others, but the figures contained in the table are as accurate and complete as it was possible to obtain under the circumstances.

The total mileage of public roads, at the close of 1909, was 67,996, which is 310 miles less than was reported in 1904. Of the improved roads, 4,398.25 miles are reported as surfaced with stone, 48.75 with bituminous-macadam, and 20,508.75 with gravel, making a total of 24,955.75 miles of improved roads, or 36.7 per cent of the total, which represents a gain for the five-year period of 1.74 per cent. There is a gain for this period of 1,103.25 miles of stone roads, and a loss of 73.25 miles of gravel roads. This discrepancy is probably due partly to an overestimate in 1904, and to the fact that, since some of the gravel roads have been neglected, they have passed into the class of unimproved roads.

Table 25 would indicate that Indiana has a large mileage of good roads. As a matter of fact, many of the roads reported as gravel roads are little better than earth roads. In Indiana the farmers are permitted to work out their taxes, and this is usually done by hauling gravel on the roads. The farmer is allowed a certain amount per load, regardless of how the material is spread or of the results obtained. In many places the gravel is merely dumped into the middle of the road and left for the traffic to spread, which results in a rough, uneven surface, and very frequently the gravel entirely disappears into the mud before the winter is past. This practice is repeated from year to year. Good results, however, are being obtained in many of the counties in Indiana in improving the gravel roads. Good road-building gravel is available in almost every county in the State, and where the material is placed on a properly prepared foundation and is properly spread and maintained the results are, in most cases, very satisfactory.

Every county in the State, except Perry, reports some stone or gravel roads, and there are only 10 counties reporting less than 10 per cent improved. Thirteen counties have between 10 and 19 per cent improved, 11 between 20 and 29 per cent, 19 between 30 and 39 per cent, and 11 counties between 40 and 49 per cent improved, while 11 counties have between 50 and 59 per cent improved. The counties reporting more than 60 per cent improved are shown in Table 1.

TABLE 1.—Counties in Indiana with more than 60 per cent of roads improved.

County.	Roads improved.	County.	Roads improved.
	<i>Per cent.</i>		<i>Per cent.</i>
Putnam.....	63.11	Wayne.....	74.87
Marion.....	65.62	Tipton.....	75.35
Fayette.....	70.14	Allen.....	76.83
Hancock.....	70.41	Dekalb.....	77.50
Wells.....	70.64	Delaware.....	78.18
Henry.....	70.75	Jackson.....	79.92
Clinton.....	71.42	Owen.....	82.36
Montgomery.....	74.69	Boone.....	90.13

The banner county, as far as mileage of gravel roads is concerned, is Boone, which, out of a total of 816 miles, reports 735.5 miles, or 90.13 per cent, improved.

COST DATA.

Cost data for Indiana are contained in Table 26. The average cost of gravel roads in the 204 townships reporting is \$1,887 per mile. The gravel roads are surfaced to a width of from 9 to 15 feet, with an average of 12 feet for the counties reporting, and an average depth of material of 9 inches.

The average cost of macadam roads for the 158 townships reporting is \$2,657 per mile. The macadam roads vary in width from 9 to 16 feet, with an average for the townships reporting of 12 feet, while the average depth of material, unrolled, is 9 inches.

The low cost of gravel and macadam roads in Indiana may be attributed to the abundance of material and to the fact that in some of the townships the roads are not carefully constructed. Most of the gravel roads are built by farmers in working out their taxes. In many places the gravel or crushed stone is placed on the road without preparation of foundation and is left for the traffic to consolidate. Moreover, a large number of these roads are so narrow as to be only a single track.

IOWA.

MILEAGE DATA.

Information contained in Table 27 was secured from township clerks and trustees with the assistance of Mr. T. H. MacDonald, State highway engineer. The information is not altogether complete, as there are quite a number of townships from which it was impossible to secure replies.

No special effort was made to correct the total mileage of improved roads since the information for 1904 had been secured from the same source as that for 1909. The total mileage, therefore, remains practically the same as in 1904, i. e., 102,427 miles.

Of this mileage, 357.25 miles are surfaced with stone, 1,572.85 miles with gravel, and 575 miles with sand-clay, making a total of 2,505.1 miles of improved roads, or 2.45 per cent.

The gain in improved roads is 116.25 miles of stone, 169.85 miles of gravel, and 575 miles of sand-clay. No sand-clay roads were reported in 1904. This gives a total gain of 841.1 miles of improved roads, or 0.83 per cent, since the percentage for 1904 was 1.62.

There are 31 counties in the State which report no improved roads, while 62 counties report less than 10 per cent improved. The counties having more than 10 per cent improved are as follows: Dubuque, 10.14; Keokuk, 11; Hancock, 12.25; Bremer, 12.35; Greene, 14.29; and Story, 21.87 per cent.

COST DATA.

The information received from the various townships in Iowa in regard to the cost of gravel and macadam roads is so meager as to render the data of little value. It is, therefore, not included in this bulletin.

The split-log drag has been used to a considerable extent in Iowa, and some valuable information was obtained from the various townships in regard to the cost of dragging per mile and per annum.

The cost of dragging per mile varies from 25 cents to 50 cents. The average cost for the 126 townships reporting is 45 cents per mile for each dragging. The average cost of dragging per mile per annum varies from \$2 to \$5, while the average for the 195 townships reporting is \$3.75. At an average cost of 45 cents for each dragging, this would indicate that the roads are dragged from seven to eight times each year in the townships where this method is practiced.

KANSAS.

MILEAGE DATA.

Information for Kansas was secured from the county surveyors and county clerks of the various counties, and was checked up by Mr. W. S. Gearhart, State highway engineer.

According to Table 28, there were 98,302 miles of public roads in the State at the close of 1909, which is nearly 3,000 miles less than was reported in 1904. Of this amount, 136.95 miles were reported as surfaced with stone, 27.75 miles with gravel, 202.25 miles with sand-clay, 4.76 miles with bituminous-macadam, and 3 miles with brick, making a total mileage of improved roads of 374.71 miles, which represents 0.38 per cent of the total. There was a reduction of about 131 miles of gravel roads

reported, but an increase of about 25 miles of stone roads and about 202 miles of sand-clay roads, which represents an increase of 0.11 per cent for the five-year period.

Kansas, like Nebraska, is not in such great need of hard roads as some of the States farther east, owing to the light rainfall and the dry climate. Earth roads, especially in the western part of the State, appear to be satisfactory for present needs. It will be seen from Table 23 that considerable progress has been made in the eastern and southern parts of the State in the building of stone, gravel, and sand-clay roads, but there are 71 counties in the State which report no improved roads, while 34 counties report less than 10 per cent improved.

COST DATA.

By reference to Table 29 it will be seen that sand-clay roads are being built in Kansas for from \$300 to \$1,600 per mile, while their average cost in the seven counties reporting is \$785 per mile. The average width of the sand-clay surface is 14 feet and the average depth of the material 10 inches.

The cost of macadam roads varies from \$2,000 to \$7,200 per mile, with an average for the eight counties reporting of \$4,070 per mile. The average width of these roads is about 15 feet and the average depth of material 11 inches, unrolled.

Franklin County reports that bituminous-macadam roads, 12 feet in width, are being built in that county for \$6,570 per mile, while Neosho County reports that macadam roads, 15 feet wide and 16 inches in depth, are being treated with an oil binder at a total cost of \$5,035 per mile.

KENTUCKY.

MILEAGE DATA.

The county court clerks, road supervisors, and county judges furnished the information contained in Table 30. Hon. M. C. Rankin, State commissioner of agriculture, rendered valuable service in checking up the reports from the various counties.

According to Table 30, there were at the close of 1909, 53,744 miles of public roads in the State, which is 3,393 miles less than was reported in 1904, owing probably to an overestimate from some counties. Of this amount 10,114.95 miles are reported as having been improved, and of these 8,709.25 miles were surfaced with stone, 1,404 miles with gravel, and 1.7 miles with bituminous-macadam. It will therefore be seen that 18.82 per cent of the roads of the State are reported as improved. The mileage of gravel roads reported for 1909 is practically the same as for 1904, but 631.25 miles of roads are reported as having been surfaced with stone during the five-year period from 1904 to 1909, which shows that the mileage of improved roads has increased for this period 2.22 per cent.

There are 46 counties in the State which report no improved roads; these are located principally in the eastern and southwestern part of the State. Central Kentucky is well supplied with limestone macadam roads. There are 21 counties in the State which report less than 10 per cent of roads improved; 12 counties with from 10 to 19 per cent; 5 counties with from 20 to 29 per cent; 5 counties with from 30 to 39 per cent; 9 counties with from 40 to 49 per cent; and 21 counties with from 50 to 92 per cent. The counties having 50 per cent and over improved are as follows: Grant, 50; McCracken, 50.66; Garrard, 51.92; Lincoln, 53.3; Carroll, 53.66; Mercer, 55.29; Clark, 56.52; Robertson, 59.09; Fayette, 66.91; Pendleton, 66.44; Jessamine, 70; Bracken, 72; Kenton, 73; Franklin, 76.16; Shelby, 81; Nicholas, 85.33; Harrison, 86.9; Gallatin, 90; Scott, 90.75; Boyle, 91.66; and Mason, 92.5 per cent.

COST DATA.

As will be seen in Table 31, gravel roads in Kentucky cost from \$320 to \$2,000 per mile, with an average for 20 counties of \$1,011 per mile. The average width of gravel roads for the counties reporting is 12 feet.

For the 43 counties reporting on the cost of macadam roads, the minimum is \$1,200 per mile and the maximum \$6,400 per mile, with an average of \$2,158 per mile. The average width for the counties reporting is 14 feet and the average depth of material is 9 inches, unrolled.

This is a rather low cost for macadam construction, but many of the roads in Kentucky are built by hand in the same way that stone roads were constructed before steam rollers and stone crushers were invented. In many parts of the State the rock is broken by hand and is often spread on the old roadbed and left for the traffic to consolidate.

The first cost of roads of this character is less than if the materials were crushed by machinery and rolled with a heavy roller, but the results are less satisfactory. There

are many parts of Kentucky, however, where very satisfactory stone roads have been built, and the low cost, as shown by these reports, is due principally to the fact that material is plentiful and labor comparatively cheap.

LOUISIANA.

MILEAGE DATA.

The clerks of the police juries and parish surveyors furnished the information contained in Table 32. Mr. Charles K. Fuqua, secretary to the governor, rendered valuable assistance in securing information from various parishes.

Table 32 shows that Louisiana had, at the close of 1909, 24,962 miles of public roads, a gain of 65 miles over 1904. Of this amount 82.5 miles are reported as surfaced with gravel, 168 miles with sand-clay, 59 miles with shell, and 5 miles with burnt sulphur ore, while 15 miles have been oiled, making a total of 329.5 miles of improved roads, which represents 1.32 per cent of the total. The gain in improved roads for the five-year period, from 1904 to 1909, is as follows: 56.5 miles of gravel, 168 miles of sand-clay, 51 miles of shell, 5 miles of burnt sulphur ore, and 15 miles of oiled roads, making a total of 295.5 miles, which represents 1.18 per cent of the total.

There are 44 parishes in the State which report no improved roads, and 11 parishes report less than 10 per cent improved, while there are only 4 parishes with more than 10 per cent improved, as follows: De Soto Parish reports 18.75 per cent improved; Richland, 40; St. Bernard, 72; and Orleans, 96.66 per cent. The parish of Orleans, however, embraces the city of New Orleans, and the roads in it can not be classed as strictly country roads.

COST DATA.

Only 2 parishes in Louisiana furnished information showing the cost of earth roads, and the average was about \$100 per mile. (Table 33.)

Sand-clay roads cost all the way from \$75 to \$2,000 per mile. The average for the 6 parishes reporting is \$654 per mile. The average width of roadway treated with sand-clay surface is 18 feet.

The average for the 2 parishes reporting on shell roads is \$3,000 per mile, and the average for the 2 parishes reporting on gravel roads is \$2,100 per mile. The shell roads are about 20 feet wide and the gravel 15.

MAINE.

MILEAGE DATA.

The information for Maine was secured from the selectmen of the various towns (i. e., townships) and was checked up by Mr. Lucius D. Barrows, who is connected with the State highway department.

As will be seen by reference to Table 34, there were, at the close of 1909, 25,528 miles of public roads in the State, which is the same mileage as was reported for 1904. Of this amount 97.07 miles are reported as having been surfaced with stone, 2,493.75 miles as surfaced with gravel, 110.97 miles as being specially improved earth roads, and 1.27 miles as being bituminous-macadam, making a total of 2,703.06 miles, or 10.59 per cent of the total.

The gain in improved roads for the five-year period is as follows: 9.53 miles of stone, 257.75 miles of gravel, 1.27 miles of bituminous-macadam, and 110.97 miles of specially improved earth roads, making a total of 379.52 miles, or 1.49 per cent. Earth roads are not usually classified as improved roads, but the 110 miles referred to are graded, drained, provided with suitable culverts and bridges, and are surfaced with selected soil, such as gravelly loam, sandy clay, etc. They should, therefore, be classified as improved roads as they are practically as good and cost almost as much as the gravel roads.

Every county in the State reports some improved roads, but there are 11 counties which report less than 10 per cent improved, while 5 counties report more than 10 per cent improved, as follows: Franklin, 10.03; Penobscot, 15.12; Androscoggin, 15.48; Washington, 18.62; and Cumberland, 19.85 per cent. Cumberland County reported 443.5 miles of gravel roads and 23.73 miles of stone roads.

COST DATA.

The cost data for Maine were secured from the State highway department and are considered accurate, as the information was obtained from the records of that department.

The average cost of roads of the different types is shown in Table 35 and is as follows: Earth, \$3,891; gravel, \$3,687; macadam, \$9,022; and bituminous-macadam, \$19,681. This includes the cost of grading, drainage, bridges, and culverts, where the bridges do not exceed a span of 20 feet. It also includes the cost of constructing V-drain foundations under most of the roads.

The earth roads referred to in Table 35 vary in width from 20 to 25 feet, and are usually surfaced with the best available soil and are practically as good as the gravel roads.

The width of the gravel roads is from 21 to 25 feet from ditch to ditch, with a gravel surface about 15 feet wide. The gravel is placed 8 inches thick in the center, and 6 inches thick at the sides.

The macadam roads vary in width from 15 to 21 feet, and the average depth is about 7 inches, varying from 8 inches in the center to 6 inches at the sides. For the 21-foot macadam roads the broken stone is laid to a depth of about 3 inches only at the sides.

The bituminous roads vary in width from 14 to 40 feet, which accounts for the high average cost. Where the roads are built to a width of 40 feet, the work is usually done on village or city streets, in order to connect important trunk line roads. The average depth of the bituminous construction is 7 inches, including 5 inches of No. 1 stone and 2 inches of bituminous surface, which is placed according to the mixing method. The cost of bituminous roads per square yard varies from 75 cents to \$1.40, with an average of about \$1.02 per square yard.

MARYLAND.

MILEAGE DATA.

The information contained in Table 36 was secured from county court clerks, county highway engineers, and county surveyors, and was checked up by Mr. W. W. Crosby, State highway engineer.

The total mileage of public roads for 1909 was 16,773, which is the same as that reported for 1904. Of this total 488 miles are reported surfaced with gravel, 1,222.8 miles with stone, 408.5 miles with shell, and 23 miles with sand-clay, making a total of 2,142.3 miles of improved roads, which is a gain of 572.3 miles for the five-year period. The gain in improved roads of the various types is as follows: Eight miles of gravel, 382.8 miles of stone, 158.5 miles of shell, and 23 miles of sand-clay. From this information it will be seen that, at the close of 1909, 12.77 per cent of the roads of the State were improved, which represents a gain for the five-year period of 3.41 per cent.

Baltimore City County has no country roads, but every other county in the State reports some improved roads, though 14 report less than 10 per cent improved and 5 report from 10 to 19 per cent improved. The counties reporting more than 20 per cent improved are as follows: Washington, 20.52; Anne Arundel, 30.23; Harford, 35.54; and Baltimore, 47.48 per cent.

COST DATA.

Frederick County reports the cost of earth roads in that county to be about \$800 per mile. Caroline and Wicomico Counties report on the cost of sand-clay roads, and the average for the 2 counties is \$1,775 per mile for an average width of sand-clay surface of 24 feet. Anne Arundel and Charles Counties report the cost of gravel roads at \$1,000 per mile, with an average width of 12 feet. The cost of shell roads is reported from 6 counties, and the minimum is \$500, while the maximum is \$5,400 per mile, with an average of \$2,984 for the counties reporting. The average width of the shell roads is 13 feet and the average depth is 8 inches. (Table 37.)

The cost of macadam roads varies from \$1,500 to \$12,800 per mile. The average for the 14 counties reporting is \$8,192. The average width of macadam is 13 feet and the average depth is 7 inches.

Baltimore County reports that macadam roads have been treated with 3 gallons of bituminous material to the square yard at a cost of 75 cents per square yard, and that macadam roads are treated with oil at a cost of about 3½ cents per square yard.

MASSACHUSETTS.

MILEAGE DATA.

The information contained in Table 38 was furnished by Mr. Arthur W. Dean, chief engineer of the Massachusetts highway commission.

The total mileage of public roads in this State at the close of 1909 was 17,272, which is 180 miles more than was reported in 1904.

There are two types of improved roads in Massachusetts, those improved by the State and towns (i. e., townships) jointly and those improved by the towns without State aid.

At the close of 1909 there were 780.66 miles of macadam roads which had been improved by the State and towns jointly, and 1,516 miles of macadam roads which had been improved by the towns without State aid. Of the gravel roads there were 61.52 miles improved by the State and towns jointly, and 6,105 miles improved by the towns without State aid. This makes a total of 8,463.18 miles of improved roads, or 49 per cent of the total, which represents a gain for the five-year period of 3.11 per cent.

Between 1904 and 1909 256.93 miles of State-aid macadam roads were constructed, while 827 miles of macadam roads were constructed by the towns without State aid. During this period 19.38 miles of State-aid gravel roads were constructed, but the mileage of gravel roads surfaced by the towns was 474 miles less in 1909 than in 1904. This discrepancy is probably due to an overestimate by some of the towns in 1904 and to the fact that some of the roads have probably been neglected and have passed into the earth-roads class.

Every county in the State reports more than 10 per cent of the roads improved. Two counties report between 10 and 19 per cent, and 6 between 20 and 29 per cent improved. The counties reporting more than 30 per cent improved are as follows: Essex, 79.42; Suffolk, 79.5; Norfolk, 82.86; Bristol, 89.66; Middlesex, 90.64; and Plymouth, 98.24 per cent. It will be noticed from Table 38 that Middlesex County has 1,878.97 miles of improved roads out of a total of 2,073 miles and that Plymouth has 1,432.44 miles of improved roads out of a total of 1,458. Most of the roads, however, in these counties are surfaced with gravel.

COST DATA.

Table 39 shows the cost of 283,407 square yards, or 33.189 miles of macadam, bituminous-macadam, and sand-oil roads which were built in the State of Massachusetts during the years 1907, 1908, and 1909 by the State highway commission. This table is copied from the reports of the State highway commission for 1909.

The average cost of the 24 sections of plain macadam road referred to in Table 39 was \$7,451 per mile, exclusive of bridges. The standard macadam road in Massachusetts is surfaced to a width of 15 feet, and the material is spread and consolidated to a depth of 6 inches in the center and about 4 inches at the sides. Most of the roads upon which the above cost data are based were built according to standard specifications.

The average cost of the seven bituminous-macadam roads referred to in Table 39 is \$9,714 per mile. These roads are built in practically the same manner as plain macadam roads, with the exception that the surface course is bonded with some bituminous preparation and screenings, instead of screenings alone. The work is usually done by what is known as the penetration method. The crown of the bituminous-macadam roads is only three-eighths inch to the foot, whereas on the plain macadam roads the crown is about three-fourths inch to the foot.

The average cost of the three sand-oil roads referred to in Table 39 is \$4,718 per mile. These roads were built for experimental purposes, and consist of a combination of asphaltic oils and sand. The work was done by the penetration and mixing methods, with the object of developing a dustless and durable road for sandy regions, which may be built without using crushed stone or gravel.

MICHIGAN.

MILEAGE DATA.

Mr. F. G. Randall, chief clerk of the State highway department and special agent of this office, furnished the mileage statistics for the State of Michigan.

According to Table 40, it will be seen that there were, at the close of 1909, 68,906 miles of public roads in the State, which is practically the same mileage as was reported for 1904. Of this amount 747.81 miles are reported as having been surfaced with stone, 3,770.58 miles with gravel, 2,381.65 miles with sand-clay, and .5 mile with bituminous-macadam, making a total of improved roads of 6,900.54 miles, or 10.01 per cent of the total mileage of roads in the State.

In 1904, 10.14 per cent of the roads in the State were reported improved, which shows a reduction for the five-year period of 0.13 per cent. This apparent falling off in the mileage of the improved roads is caused by a reduction in the mileage of gravel roads reported. The mileage of gravel roads reported for 1904 exceeded the mileage reported for 1909 by about 3,007 miles. There were, however, no sand-clay roads reported for 1904, and it is possible that some gravel roads have been reclassified as sand-clay roads. Nevertheless, even if the sand-clay and gravel roads are added together, it will be

seen that the mileage of gravel roads reported in 1904 still exceeds the total of gravel and sand-clay roads reported for 1909 by 624.77 miles. This is probably due partly to an overestimate of the mileage of gravel roads in 1904 and partly to the fact that under the new classification many of the roads which were formerly reported as gravel roads have been reclassified as earth roads.

The gain in stone roads for the five-year period is 499.31 miles. Every county in the State reports some improved roads, but there are 50 counties which report less than 10 per cent improved; 17 counties have from 10 to 19 per cent improved; 4 from 20 to 29 per cent; and 12 counties report over 30 per cent improved, as follows: Dickinson, 30.59; Menominee, 31.01; Van Buren, 33.06; Baraga, 34.13; Houghton, 35.11; Schoolcraft, 35.7; Ontonagon, 38.33; Keweenaw, 38.6; Alpena, 45.89; Gogebic, 54.94; Mackinac, 59.45; and Chippewa, 61.71 per cent.

COST DATA.

The cost data for Michigan are shown in Table 41. This information was obtained from the annual report of the Michigan State highway department for 1909, and represents the cost of roads built by the counties and townships under the State reward system, which may be described briefly as follows:

On roads 18 feet in width between ditches and having grades of not over 6 per cent, and which are surfaced to a width of not less than 9 feet, the State pays a reward as follows: Sand-clay or gravel-clay roads, \$250 per mile; gravel roads, \$500 per mile; stone-base and gravel-surface roads, \$750 per mile; gravel or slag base with stone surface, \$750 per mile; macadam or bituminous-macadam roads, \$1,000 per mile; concrete, with or without brick surface, \$1,000 per mile. The depth of materials on the gravel roads must be not less than 8 inches consolidated, and on the stone roads and the stone-gravel roads not less than 7 inches consolidated, and they must be built according to specifications of the State highway department and be accepted by that department before the reward is given.

It will be seen from Table 41 that the cost of gravel roads built under this system in the various townships varies from \$461 to \$6,422 per mile, with an average of \$1,843 per mile for the 75 sections of road referred to in the table.

The cost of the macadam roads varies from \$1,421 to \$12,128 per mile, with an average cost of \$4,346 per mile for the 65 sections.

MINNESOTA.

MILEAGE DATA.

The mileage statistics for Minnesota were secured from county auditors and county surveyors of the various counties and were checked up by Mr. George W. Cooley, State highway engineer.

From the information contained in Table 42, it will be seen that there were, at the close of 1909, 79,323 miles of public roads in the State, of which 5,416.85 miles were improved as follows: 137.35 miles with stone, 4,228 miles with gravel, and 1,051.5 miles with sand-clay.

From these figures it appears that 6.83 per cent of the roads were improved at the close of 1909, as compared with 7.87 per cent in 1904. There were no sand-clay roads reported in 1904. The mileage of gravel roads reported for 1904 exceeds the mileage reported in 1909 by 1,951 miles. Some of these roads have evidently been reported in 1909 as sand-clay roads, but aside from this fact there is still a considerable discrepancy for which there is no way of accounting except on the ground that in many communities gravel roads are being neglected and the people are turning their attention to the construction of stone roads. In many places gravel roads which were built five years ago have so disintegrated owing to improper methods of construction or poor maintenance that they would naturally be reported at this time as earth roads.

There are 17 counties in Minnesota which report no improved roads for 1909; 47 counties report less than 10 per cent improved, and 14 counties report between 10 and 20 per cent improved. The 7 counties reporting more than 20 per cent improved are as follows: Ramsey, 20.53; Dodge, 25.86; Olmsted, 29.64; Roseau, 34; Morrison, 35.31; Cook, 48; and McLeod, 49.01 per cent.

COST DATA.

As shown in Table 43, only 2 counties in Minnesota reported in regard to the cost of earth roads, with an average cost of \$275 per mile. Three counties report on the cost of sand-clay roads, with an average of \$766 per mile. The average width of the sand-clay roads is 20 feet.

Fourteen counties furnish information in regard to the cost of gravel roads at a minimum cost of \$150 and a maximum cost of \$1,700 per mile. The average for the counties reporting is \$946 per mile, while the average width of the gravel surface is 14 feet. One county, Winona, reports the cost of gravel roads as \$0.15 per square yard.

Eight counties furnish information in regard to the cost and width of macadam roads. The minimum cost is given as \$1,700 and the maximum as \$6,000 per mile, with an average cost of \$3,280. The average width is 12 feet and the average depth 6 inches. Winona County reports the cost of macadam roads as 65 cents for country roads and \$1.20 per square yard for city streets.

MISSISSIPPI.

MILEAGE DATA.

The mileage statistics for Mississippi were secured from the county surveyors, county supervisors, and the chancery clerks of the various counties and were verified by Mr. E. N. Lowe, State geologist.

The total mileage of public roads at the close of 1909 is reported to have been 39,619 (Table 44), which represents a gain over the mileage in 1904 of 921 miles. This discrepancy is probably due to an underestimate by various county officers in 1904.

Of the total mileage of public roads, 52.5 miles are reported surfaced with stone, 165.75 miles with gravel, 103 miles with sand-clay, 1 mile with burnt clay, and 20 miles with shell, making a total of 342.25 miles, which represents a gain over the improved road mileage in 1904 of 193.25 miles. The increases of improved roads of the various types for the five-year period are as follows: 52.5 miles of stone, 56.75 miles of gravel, 103 miles of sand-clay, and 1 mile of burnt clay. It will be noticed that there were no stone or sand-clay roads reported for 1904. From these figures it appears that only 0.86 per cent of the public roads of Mississippi are improved. This represents a gain for the five-year period of 0.55 per cent.

There are 59 counties in Mississippi which report no improved roads for 1909; 18 counties report less than 9 per cent improved; while only one county, Sunflower, reports more, namely, 10 per cent.

COST DATA.

The cost of earth roads in Mississippi, as shown in Table 45, varies from \$16 to \$275 per mile, with an average for the 5 counties reporting of \$97.

The minimum cost of gravel roads reported is \$650 and the maximum \$5,000, with an average of \$2,058 per mile for the 6 counties reporting.

Only 2 counties furnished information in regard to the cost of macadam roads and the average was \$5,135. The average width of the macadam roads is 16 feet.

MISSOURI.

MILEAGE DATA.

The mileage statistics for Missouri were secured principally from county highway engineers and county clerks and were checked up by Mr. Curtis Hill, State highway engineer.

According to Table 46 there were, at the close of 1909, 107,923 miles of public roads. In 1904 data collected from the same source indicated that the total mileage of public roads of Missouri was 108,133. This means a decrease of 210 miles for the five-year period.

Of the total mileage of public roads in Missouri for 1909, 2.25 miles are reported surfaced with sand-clay, 1,240.75 miles with stone, and 3,512.5 miles with gravel, making a total of 4,755.5 miles as against 2,733 miles in 1904. In 1904, 2.53 per cent of the roads of the State were reported as having been improved, but the percentage for 1909 is 4.4, which shows a gain of 1.87 per cent.

By referring to Table 46 it will be seen that 53 counties report no roads improved, 43 counties report less than 10 per cent improved, 8 counties report from 10 to 19 per cent improved, 5 counties report from 20 to 29 per cent improved, while 5 counties report over 30 per cent improved, namely, Gasconade, 31.22; Marion, 31.75; Cole, 33.61; St. Louis, 36.1; and Jasper, 61.55 per cent.

COST DATA.

From Table 47 it will be seen that only 2 counties report the cost of earth roads, with an average cost of \$275 per mile for an average width of 28 feet.

Scott County reports the cost of sand-clay roads to be \$300 per mile.

The minimum cost of gravel roads is \$250 per mile and the maximum \$3,168, with an average cost of \$1,023 for the 22 counties reporting. The average width of gravel surface is 14 feet.

The cost of the macadam roads varies from \$1,000 to \$6,700 per mile, and the average cost for the 21 counties reporting is \$3,388. The average width of macadam roads is 14 feet and the average depth, unrolled, 10 inches.

St. Charles County reports the cost of Telford macadam roads as \$5,000 per mile. These roads have a width of 16 feet and a depth of 14 inches.

Adair County reports the cost of bituminous construction at \$2.10 per square yard.

MONTANA.

MILEAGE DATA.

The data for Montana were collected principally from county clerks and county surveyors and were checked up by Hon. E. L. Norris, governor of the State.

The total mileage, as reported for 1909, was 23,319 (Table 48), which exceeded the total reported for 1904 by 900 miles. Only 95 miles of stone and gravel roads are reported for the State, which indicates that only 0.41 per cent of the roads of the State are improved.

Montana is a very large State, with diversified topography, climate, and soil conditions, while the population varies from dense to extremely sparse. It would therefore be expected that road building would be found in various stages of development. It will be seen from Table 48 that very little has been done in the way of building permanent stone and gravel roads, and 19 counties report no roads improved, while the other 9 counties all report less than 10 per cent. Considerable attention, however, has been devoted to the building of bridges and of roads over the natural soil. Gravel is abundant in many sections of the State and is being utilized as funds become available. Natural gravel roads also exist in a few localities. In other sections the material for building hard roads is difficult to obtain.

COST DATA.

As will be seen from Table 49, Dawson County reports the cost of 20-foot earth roads as \$300 per mile. Beaverhead County reports the cost of earth-road construction to be about 21 cents per cubic yard.

Sand-clay roads in Rosebud County are built to a width of about 18 feet, and their cost is about 23 cents per cubic yard.

Dawson County reports the cost of gravel roads at \$800 per mile, and Beaverhead County at 62 cents and Fergus County at 52 cents per square yard. The average width of these roads is 20 feet.

NEBRASKA.

MILEAGE DATA.

The mileage statistics for Nebraska were secured from the county clerks and county surveyors of the various counties and were checked up by Prof. Erwin H. Barbour, State geologist.

By referring to Table 50 it will be seen that at the close of 1909 there were 80,338 miles of public roads in the State, which exceeds the mileage reported for 1904 by 876 miles. There were only 248.55 miles reported as having been improved, of which 52.5 miles were surfaced with stone, 179.75 miles with sand-clay, .5 mile with gravel, 1 mile with brick, 1.5 miles with concrete, and 13.3 miles with bituminous-macadam, making 0.31 per cent of improved roads in the State. In 1904, .03 per cent of improved roads was reported.

There are 77 counties in Nebraska which report no improved roads for 1909; 12 counties report less than 10 per cent improved; while only one county, Cedar, reports more, namely, 10.74 per cent.

The need for macadam, gravel, and other hard roads is not as great in Nebraska as in many other States. Particularly is this true of the western portion of Nebraska, where the rainfall is light and where the prairie roads are fairly good in all seasons of the year. Stone and gravel roads are needed, however, in many thickly settled regions east of the center of the State, where the loess and gumbo soils prevail and where the rainfall is heavier than on the sandy prairies farther west.

COST DATA.

The cost data for Nebraska are presented in Table 51. Three counties furnished information in regard to the cost of sand-clay roads, which varies from \$200 to \$1,600 per mile, with an average for the counties reporting of \$933 per mile.

Nemaha County reports that macadam roads cost about \$6,000 per mile, while Douglas County reports the cost of bituminous construction as \$8,448 per mile for roadways 12 feet in width and 7 inches in thickness.

NEVADA.

MILEAGE DATA.

Mileage statistics were secured principally from county clerks and county commissioners. The returns were checked up by Mr. Louis Beaver, State commissioner of agriculture.

According to the figures contained in Table 52, there were, at the close of 1909, 12,751 miles of public roads in the State, which exceeded the total reported for 1904 by 166 miles. Only 46 miles are reported to have been improved—45 miles with gravel and 1 mile with stone. There was, therefore, only 0.36 per cent of improved roads at the close of 1909, and this is a little less than the percentage reported for 1904.

Nine counties in Nevada report no improved roads for 1909; 4 counties report less than 10 per cent; while only 1 county, Ormsby, reports more, namely, 11.88 per cent.

The need for stone and gravel roads is not as great in Nevada as in many other States where the traffic is heavy, and where the soil and climatic conditions necessitate hard roads. Nevada is sparsely settled and is an arid or semiarid region, and a large portion of the country is devoted to mining and stock raising. There are a number of miles of stage road in various parts of the State, but the soil over which these roads pass is composed of gravel or of sand, clay, and soil mixtures, which makes very good natural roads. Nevada's progress in road building should not, therefore, be judged entirely by the percentage of her mileage of stone and gravel roads.

NEW HAMPSHIRE.

MILEAGE DATA.

Mileage statistics for New Hampshire were secured from the selectmen of the various towns (i. e., townships). The reports were then submitted to Mr. H. C. Hill, State highway commissioner, but he was unable to check up the returns except for the total mileage of public roads.

This total for 1909 is the same as that reported for 1904 (Table 53), that is, 15,116 miles. The total mileage of improved roads at the close of 1909 was 1,448.48. Of the improved roads, 201.82 miles are reported to have been surfaced with stone and 1,246.66 with gravel. The gain in improved roads for the five-year period from 1904 to 1909 was as follows: 83.82 miles of stone and 71.66 miles of gravel, making a total gain of 155.48 miles. The percentage of all roads improved at the close of 1909 was 9.58, which exceeded the percentage for 1904 by 1.03.

It will be noticed from Table 53 that every county in the State reports improved roads; 5 counties report less than 10 per cent improved and 5 counties report between 10 and 20 per cent improved. The figures given above are not very satisfactory, however, as there were several towns from which it was impossible to secure complete returns, although numerous letters were written to the selectmen.

COST DATA.

Table 54 shows the cost data for New Hampshire. Cheshire Township reports the cost of earth roads as \$1,750 per mile, with an average width of 19 feet. Orange Township reports that sand-clay roads are being built at an average cost of about \$620 per mile.

Gravel roads cost from \$500 to \$4,500 per mile, with an average for the 43 towns reporting of \$2,352 per mile. The average width of gravel surface is 18 feet and the average depth 9 inches. Seven towns report the cost by the square yard instead of by the mile; the minimum cost given is 20 cents and the maximum 90 cents, with an average of 60 cents per square yard.

Macadam roads cost from \$2,000 to \$7,700 per mile, and the average for the 31 towns reporting is \$5,016 per mile. The average width of the macadam is 16 feet and the average depth 9 inches. For the 3 towns reporting the cost by the square yard the average is 97 cents.

NEW JERSEY.

MILEAGE DATA.

Mileage statistics for New Jersey were furnished by Col. Edward A. Stevens, State commissioner of public roads.

As shown in Table 55, there were, at the close of 1909, 14,842 miles of public roads, which is the same as was reported for 1904. Of this mileage 3,377.86 miles are reported as having been improved, of which 211.33 miles are surfaced with bituminous-macadam, 2,594.09 miles with plain macadam, and 572.44 miles with gravel.

The gain in improved roads of the various types is as follows: 211.33 miles of bituminous-macadam, 693.04 miles of plain macadam, and 90.97 miles of gravel, making a total gain of improved roads of 995.56 miles for the five-year period. There were no bituminous-macadam roads reported for 1904. It will therefore be seen that 22.76 per cent of the public roads of the State were reported as having been improved at the close of 1909, which shows a gain over the mileage in 1904 of 6.44 per cent.

Every county in the State reports some improved roads; 7 counties have less than 10 per cent improved and 7 others have between 10 and 20 per cent improved. The counties having over 20 per cent improved are as follows: Camden, 34.86; Mercer, 35.36; Union, 36.5; Middlesex, 38.7; Passaic, 45.91; Bergen, 49.13; and Essex, 96.41 per cent.

COST DATA.

The cost data contained in Table 56 were obtained from the annual report of the State commissioner of public roads for 1909 and represent the cost of various roads built in the State of New Jersey under the directions of the State highway department during the years 1907, 1908, and 1909.

The average cost of the gravel roads for the 11 counties reporting is \$4,317 per mile. The gravel roads vary in width from 14 to 20 feet, but the majority of them are about 20 feet in width. The gravel is placed to a depth of from 8 to 9 inches in the center and from 3 to 4 inches at the sides.

The average cost of macadam roads is \$8,746 per mile for the 10 counties reporting. All of these roads are surfaced to a width of 14 feet and vary in depth from 4 to 8 inches, with an average depth of about 6 inches.

It will be noticed from Table 56 that the Washington Valley Road in Somerset County cost \$13,406 per mile. This is above the average cost for macadam-road construction in New Jersey and is due to the fact that it was necessary to relocate the road and reduce the grades. The maximum grade on the old road was 11 per cent, which was reduced to 3.8 per cent.

The average cost of bituminous-macadam roads for the 6 counties reporting is \$9,930 per mile. The average width of these roads is about 14 feet and the average depth from 6 to 8 inches. Most of this work was done according to the penetration method.

NEW MEXICO.

MILEAGE DATA.

Mileage statistics for New Mexico were secured principally from the probate clerks of the various counties and were checked up by Mr. C. H. Neel, territorial road engineer.

The total mileage of public roads, for the year 1909, as shown in Table 57, was 16,920, which exceeds the total reported for 1904 by 1,594 miles. There were only 104 miles of improved road reported—25 miles of stone, 8 miles of gravel, and 71 miles of sand-clay, which represents only 0.61 per cent of the total. The improved roads for 1904 amounted to only 2 miles of gravel.

Twenty-three counties in New Mexico report no improved roads for 1909; two counties report less than 10 per cent; while only one, Otero, reports more, namely, 10.2 per cent.

Road building in New Mexico is as yet almost entirely confined to the construction of earth roads. The difficulties encountered by the road builder are many and far from easy of solution. Chief of these are a sparse population, dry climate, and rugged topography. Macadam, gravel, and sand-clay roads have been built to some extent, as will be seen from Table 57, but in general the main efforts have been directed toward the building of the best possible roads with the materials at hand and reducing the grades in mountain sections.

NEW YORK.

MILEAGE DATA.

Mileage statistics for New York were furnished by Mr. T. Warren Allen, a member of the State highway commission.

According to Table 58, there were, at the close of 1909, 79,279 miles of public roads in the State. This exceeds the figures given in 1904 by 5,481 miles. Of the total mileage of public roads in the State, 12,787.36 miles are reported as having been improved at the close of 1909, and of these 2,307 miles were surfaced with macadam under the direction of the State highway department, 2,307.4 miles by the towns without State aid, and 8,172.96 miles with gravel by the towns without State aid.

The gain in improved roads for the five-year period from 1904 to 1909 is as follows: 1,600 miles of macadam road improved under State aid, 830.4 miles of macadam roads

improved by the towns, and 4,480.96 miles of gravel roads improved by the towns without State aid, making a total gain of 6,911.36 miles. It will therefore be seen that, at the close of 1909, 16.13 per cent of the roads were reported as having been improved, which shows a total gain in improved roads for the five-year period of 8.17 per cent.

Improved roads are reported from every county in the State, but there are 24 counties having less than 10 per cent improved, 15 counties having from 10 to 20 per cent improved, and 9 counties having from 20 to 30 per cent improved. The counties having over 30 per cent improved are as follows: Ontario, 30.88; Westchester, 33; Orange, 44.9; Orleans, 47.42; Dutchess, 49.34; Rockland, 51.61; Hamilton, 60.75; Monroe, 63; and Genesee, 72.83 per cent. Kings, New York, Queens, and Richmond Counties lie entirely within Greater New York and so have no country roads.

COST DATA.

The cost data for New York were furnished by the State highway department and are shown in Table 59. The cost of macadam roads per mile varies between wide limits, with an average for the year 1909 of approximately \$9,496. The average width of macadam is 14 feet and the average depth about 5 inches. The cost of macadam roads varies considerably with the different materials used, and is, therefore, presented under the following headlines: "Limestone," "Trap rock," "Field stone," and "Miscellaneous."

The average cost of limestone macadam roads for the 29 counties reporting is \$9,370 per mile. The average width is 15 feet, and the average depth 5 inches.

The average cost of the trap-rock macadam roads is \$10,183 per mile for the 27 counties reporting. The average width of these roads is 15 feet, and the average depth 3 inches of trap-rock surface. The foundation of the trap-rock roads is usually composed of local stone. The average cost per mile of macadam roads built of field stone for the 12 counties reporting is about \$8,428. The average width of field-stone macadam roads is 14 feet, and the average depth 5 inches.

The average cost per mile of roads shown under the head of "Miscellaneous macadam" is as follows:

TABLE 2.—Miscellaneous macadam roads—New York, 1909.

Material.	Cost per mile.	Average width.	Average depth of foundation.	Material.	Cost per mile.	Average width.	Average depth of foundation.
		<i>Feet.</i>	<i>Inches.</i>			<i>Feet.</i>	<i>Inches.</i>
Local sandstone....	\$9,009	14	5	Granite.....	\$8,163	14	4
Syenite.....	11,678	15	2	Local stone.....	10,346	14	6
Local bluestone....	8,112	14	5	Gneiss.....	9,857	16	4
Quartz.....	7,980	14	5	Local shale.....	4,795	12	5

It will be noticed that the average depth of the roads surfaced with syenite is 2 inches. Roads built of this material are provided with foundations composed of local stone.

The average cost of gravel roads for the 5 counties reporting is \$5,950 per mile. Their average width is 17 feet, and their average depth 7 inches.

NORTH CAROLINA.

MILEAGE DATA.

Mileage statistics for North Carolina were secured principally from county auditors, road commissioners, and clerks of the superior courts. Dr. Joseph Hyde Pratt, State geologist, rendered valuable assistance in collecting information and in checking up the final returns.

According to Table 60, there were, at the close of 1909, 48,285 miles of public roads in the State, which is less by 1,478 miles than the total reported for 1904. Of this total, 2,313 miles are reported as having been improved at the close of 1909, of which 1,038.5 miles were surfaced with stone, 545 miles with gravel, and 729.5 miles with sand-clay. The gain in improved roads for the five-year period was as follows: 639.5 miles of stone, 123 miles of gravel, and 291.5 miles of sand-clay, making a total gain of 1,054 miles. From these figures it will be seen that, at the close of 1909, 4.79 per cent of

the roads were improved, which represents a gain for the five-year period of 2.26 per cent.

There are 45 counties in the State which reported no improved roads, while 36 counties reported less than 10 per cent improved. Eleven counties reported between 10 and 20 per cent improved. The counties reporting more than 20 per cent improved are as follows: Vance, 22.5; Gaston, 22.66; New Hanover, 25; Mecklenburg, 27.41; Rowan, 29.66; and Richmond, 40.33 per cent.

COST DATA.

The cost data for North Carolina are shown in Table 61. Only 1 county reports on the cost of earth roads—Johnson County—where the average cost for this type is \$800 per mile.

Sand-clay roads vary in cost from \$250 to \$1,200 per mile, with an average for the 13 counties reporting of \$506 per mile. The average width of the sand-clay surface is 24 feet.

Eight counties report on the cost of gravel roads, with a minimum cost of \$300, a maximum cost of \$2,500, and an average of \$1,006 per mile. The average width of gravel roads is 20 feet, and the average depth 8 inches.

The minimum cost of macadam roads is \$3,000, and the maximum \$6,000, while the average is \$4,020 per mile. The average width of macadam roads is 12 feet, and the average depth 8 inches. Durham County reports that where macadam roads are built by convict labor the cost is \$5,000 per mile, but where the work is done by contract the cost is about \$6,000.

NORTH DAKOTA.

MILEAGE DATA.

County auditors and county surveyors furnished the information in regard to road mileage in North Dakota. Dr. A. G. Leonard, State geologist, checked up the returns from the various counties.

The total mileage of public roads as reported from the various counties was, at the close of 1909, 61,593 miles (Table 62), which is a gain over the total reported for 1904 of 2,261 miles. There were only 140 miles of gravel road reported, which is 65 miles less than was reported in 1904. No stone roads were reported for 1909, but 7 miles were reported for 1904. At the close of 1909, .23 per cent of the roads were improved, which represents a loss of .13 per cent for the period from 1904 to 1909.

Twenty counties in the State report no improved roads, while 26 others report less than 10 per cent improved. North Dakota has therefore made very little progress in road building during the last five years.

The need for stone and gravel roads, however, is not so great in this State as in many of the States farther south. The traffic is light, and during the winter months the roads are frequently covered with ice and snow, which makes it impossible to draw large loads to market with a 2-horse team.

OHIO.

MILEAGE DATA.

Information regarding the mileage of improved roads in Ohio was obtained from the county commissioners, surveyors, and auditors, and from the township clerks. The returns were then submitted to the State highway department to be checked. A comparison of the data obtained by the United States Office of Public Roads with that compiled by the State highway commissioner revealed much similarity, and it was therefore decided that, as the State highway commissioner was in close touch with local conditions, it would be better to use his figures as a whole rather than to make individual corrections or to combine the data collected in the two investigations. The information collected by this office has served, however, to verify the data secured by the State highway department.

According to the data contained in Table 63, there were, at the close of 1909, 83,861 miles of public roads in the State of Ohio. Statistics collected by townships in 1904 by this office, and published in Bulletin No. 32, showed the total mileage of public roads to be 69,439. The discrepancy between the 1904 and 1909 figures is greater than was expected, and is probably due to the fact that in 1904 correspondents failed to report many miles of section lines as public roads. It is quite probable that many of these section lines and, in many cases, quarter-section lines have been opened up as public roads since 1904. In Ohio, as well as in many other States, where the land was

laid out by the Government, the roads follow the section lines, and, in thickly settled communities, the quarter-section lines. Most of these section lines have been set apart by law as public roads, whether or not they have been opened up or used for this purpose. The 1904 investigation was the first of its kind ever undertaken and it was of necessity much more in the nature of an estimate than this investigation, in which it has been possible to obtain more reliable data.

Of the 88,861 miles of public roads in Ohio in 1909, 14,188 miles were reported surfaced with gravel, 9,687 with stone, and 231 with brick, making a total of 24,106 miles of improved roads. Only 93.25 miles of brick roads were reported in 1904. It appears, therefore, from these figures that 27.13 per cent of the roads of the State have been improved. According to the statistics collected in 1904, the improved roads in the State represented 33.79 per cent of the total mileage; and while the new figures apparently show a falling off of improved roads, this is not actually the case, as the total mileage of roads reported for 1909 is much larger than the 1904 figures.

In 1904, 16,159 miles of gravel roads were reported for the State, as compared with 14,188 miles for 1909, which shows an apparent falling off of 1,971 miles of gravel roads in the five-year period. It is quite probable, however, that some of these gravel roads have been surfaced with stone since 1904. In 1904, 7,160.5 miles of stone roads were reported, as against 9,687 miles for 1909, an increase of 2,526.5 miles.

The gain or loss in gravel-road mileage is much more difficult to ascertain than the gain or loss in stone-road mileage. Gravel roads, as they are ordinarily built in Ohio, deteriorate rapidly. The term "gravel road," according to the popular conception, covers such a wide latitude that roads are frequently reported as gravel roads which should not be so classified. For this reason, correspondents reporting on gravel roads in the same county could easily submit widely varying reports, according to their respective conceptions of what constitutes a gravel road. It is therefore no more than just that Ohio's progress from 1904 to 1909 should be judged by the increase in the mileage of crushed-stone and brick roads.

Only 3 counties in the State report no improved roads, while 26 counties report less than 10 per cent improved, 42 counties report over 25 per cent improved, 18 counties report over 50 per cent improved, and 8 counties report over 75 per cent improved, as follows: Union, 76.63; Warren, 80; Clinton, 81.32; Greene, 82.66; Madison, 89.2; Butler, 93.35; and Montgomery, 93.8 per cent; while Clark County reports all roads improved. According to the report of the county surveyor of Clark County there are 862 miles of public roads in the county, of which 793 miles are surfaced with gravel and 69 miles with stone.

COST DATA.

The cost data for Ohio are shown in Table 64. Gallia County reports that the average cost of earth roads is about \$1,600 per mile.

Gravel roads cost from \$500 to \$4,000 per mile, with an average for the 16 counties reporting of \$1,909 per mile. The average width of gravel roads is 11 feet and the average depth 6 inches.

The cost of macadam roads varies from \$2,000 to \$9,000 per mile, with an average for the 53 counties of \$4,580 per mile. The average width of the macadam roads is about 12 feet and the average depth of loose material 10 inches. The cost of bituminous-macadam construction for the 3 counties reporting is from \$5,000 to \$10,300 per mile, with an average of \$7,766. The average width of the bituminous-macadam roads is about 16 feet and the average depth 9 inches.

The minimum cost of brick roads for the 6 counties reporting is \$10,783 per mile, while the maximum is \$14,500, and the average is \$12,381. The width of brick roads varies from 12 to 20 feet.

OKLAHOMA.

MILEAGE DATA.

Mileage statistics for Oklahoma were secured from county court clerks and county judges, and were checked up by Mr. L. C. Snyder, of the State geological survey.

At the close of 1909 the total mileage of public roads, as reported from the various counties, was 71,325 miles (Table 65), which exceeds the total reported for 1904 by 27,771 miles. This large discrepancy is accounted for by the fact that in 1904 the State of Oklahoma had not been organized. There were only 26 counties in Oklahoma in 1904, but at the close of 1909 there were 76 counties, which included a number of newly organized counties as well as those added to Oklahoma when Indian Territory became a portion of the State.

There were practically no improved roads in Oklahoma in 1904, but at the close of 1909 there were 361 miles, as follows: 23.5 miles of stone, 141.5 miles of gravel, and 196 miles of sand-clay, which represents 0.5 per cent of roads improved.

Sixty counties report no improved roads, while 17 others report less than 10 per cent improved. Pittsburg County heads the list with 21 miles of stone road and 102 miles of gravel, which shows that 9.46 per cent of the roads of that county are improved.

COST DATA.

The cost data for Oklahoma are contained in Table 66, which shows that the cost of sand-clay roads varies from \$72 to \$800 per mile, with an average for the 5 counties reporting of \$389 per mile.

There are only 2 counties which furnished information in regard to the cost of macadam construction, and the average for those 2 was \$3,750 per mile.

OREGON.

MILEAGE DATA.

The mileage data for Oregon were secured from county clerks and county judges. It was impossible to find anyone in the State who was sufficiently familiar with conditions to verify the reports from the various counties, and it was therefore decided to accept the reports as they had been received from the county officials.

The total mileage of public roads in 1909, as shown by Table 67, was 29,475, which is a reduction of 4,783 miles from the figures shown in 1904.

Of this total, 2,799.25 miles were reported as having been improved as follows: 451.25 miles with stone, 1,871 miles with gravel, 345 miles with sand-clay, 130 miles with planks, and 2 miles with bituminous-macadam.

The gain in improved roads for the five-year period from 1904 to 1909 was 242.25 miles of macadam and 345 miles of sand-clay, but no sand-clay roads were reported for 1904, and the total mileage of improved roads for 1909 shows an actual gain of only 210.25 miles. It will therefore be seen that 9.49 per cent of the roads of the State were improved at the close of 1909, which shows a gain over 1904 of 1.93 per cent.

Six counties report no roads improved, 15 counties have less than 10 per cent of roads improved, 7 counties report from 10 to 20 per cent improved, and 6 counties report over 20 per cent improved. Of these Linn reports 20.66 per cent improved; Yamhill, 26.66; Clatsop, 30; Columbia, 35.29; Tillamook, 41; and Multnomah, 51.11 per cent. There are very few miles of improved roads reported from central, northern, or eastern Oregon. This is due principally to the sparse population. The greatest progress in road building appears to be confined to the Willamette Valley, which lies in the western part of the State between the Cascade and Coast Ranges of mountains.

All parts of the State are abundantly supplied with splendid road-building material. Trap rock of the very best quality for road building is well distributed throughout the State, and the Willamette, Rogue River, Willowa, and the Grand Valleys are all supplied with gravel of a good quality.

COST DATA.

As will be seen from Table 68, gravel roads vary in cost in Oregon from \$600 to \$3,500 per mile, with an average for the 6 counties reporting of \$1,940 per mile. The average width of gravel surface is from 9 to 10 feet and the average depth of material from 6 to 8 inches.

Macadam roads vary in cost from \$2,000 to \$5,000 per mile, while the average for the 7 counties reporting is \$3,491 per mile. The average width of these roads is 10 feet and the average depth of the material from 5 to 8 inches.

The low cost in some of the counties is due to the abundance of road-building material. Trap rock is within easy hauling distance of the main roads in nearly every county in the State. Benton County reports that bituminous roads are being built at a cost of about \$2 per square yard.

PENNSYLVANIA.

MILEAGE DATA.

Mileage statistics for Pennsylvania were secured from Mr. R. D. Beman, deputy State highway commissioner, and Mr. C. E. Douglas, a special agent of this office. This information was supplemented by reports from county commissioners and township trustees.

There were, at the close of 1909, 87,386.79 miles of public roads in the State (Table 69), of which 3,364.76 miles, or 3.84 per cent of the total road mileage, were improved. It

was reported that 741.64 miles were surfaced with macadam and 29.15 miles with brick, and all of these were built under the direction of the State highway department.

It is worthy of note that in 1904 Pennsylvania had only 9.25 miles of macadam roads, built under the direction of the State highway department, which shows a gain of about 732 miles in five years. The gain in improved roads, however, for the five-year period for the whole State is only 1.67 per cent.

There are only 2 counties in the State which reported no improved roads, but 58 counties, however, reported less than 10 per cent improved. The counties reporting more than 10 per cent improved are as follows: Lebanon, 12.99; Blair, 20.38; Berks, 23.13; Montgomery, 23.48; Allegheny, 25.33; and Delaware, 42.84 per cent. Philadelphia County is coextensive with the city and has no country roads.

COST DATA.

Cost data for Pennsylvania are shown in Table 70. The cost of gravel roads varies from \$400 to \$3,000 per mile, and the average for the 8 townships reporting is \$1,575 per mile. There are only 3 counties in the State which report the cost of gravel roads. The average width of these roads is 14 feet and the average depth of material 10 inches.

The minimum cost of macadam construction is \$1,425 and the maximum \$16,042 per mile. The average for the 38 townships reporting is \$9,164 per mile. The average cost of macadam roads for the 6 townships in Delaware County which report the cost by the square yard is 78 cents. The average width of the macadam surface is 16 feet and the average depth of material, unrolled, 10 inches.

Nether Providence, in Delaware County, reports that bituminous-macadam roads are being built there at a cost of \$10,000 per mile.

Allegheny, Venango, and Warren Counties report that brick roads are being built within their limits at an average cost of \$16,334 per mile. These roads vary in width from 12 to 20 feet, with an average of about 15 feet.

RHODE ISLAND.

MILEAGE DATA.

Mileage statistics for Rhode Island were furnished by Mr. P. J. Lannon, clerk of the State board of public roads.

The total mileage of public roads as reported for 1909 was 2,120.75 miles (Table 71), which shows a loss from the mileage in 1904 of 240.25 miles. The total mileage of improved roads in the State in 1909 was 1,042.07, of which 21.97 miles were surfaced with bituminous-macadam, 409.1 miles with plain macadam, and 605 miles with gravel. There were no bituminous-macadam roads reported for 1904. The loss in gravel roads for the five-year period was 169.5 miles, and the gain in stone roads was 162.1 miles. Therefore, 49.14 per cent of the public roads of the State were improved at the close of 1909, which shows a gain of 5.87 per cent over the mileage in 1904.

Newport County reports 35.38 per cent of improved roads; Bristol County, 52.51 per cent; Washington County, 57.74 per cent; and Providence County, 61.25 per cent.

COST DATA.

Reports received from Mr. Lannon indicate that the average cost of macadam roads in Rhode Island is about 80 cents per square yard, and that bituminous-macadam roads cost on an average about \$1.25 per square yard. The cost is about the same in the 4 counties of the State.

SOUTH CAROLINA.

MILEAGE DATA.

The information for South Carolina was secured from county supervisors, clerks of the county courts, and clerks of the boards of county commissioners. Mr. Earl C. Sloan, State geologist, and Mr. E. J. Watson, State commissioner of agriculture, rendered valuable assistance in collecting and verifying reports from the various counties.

The total mileage of public roads reported for 1909 was 32,075 miles (Table 72). It will be noticed that the figures given for 1904 exceed those given for 1909 by 9,755 miles. This discrepancy is probably due to the fact that a number of the correspondents overestimated the mileage in 1904.

Of the total mileage of public roads in the State in 1909, 153.75 miles were surfaced with stone, 131 miles with gravel, 32 miles with shell, and 3,218 miles with sand-clay, making a total of 3,534.75 miles of improved roads, which represents 11.02 per cent of the total mileage of the State.

The gain in improved roads for the five-year period from 1904 to 1909 was 84.75 miles of stone and 1,643 miles of sand-clay, and this, with the reduction of 48 miles of gravel roads and 23 miles of shell road, makes a total gain of 1,656.75 miles. From these figures it would appear that 6.54 per cent of the roads were improved during the five-year period, but as a matter of fact the gain has not been as great as that, because of the great reduction in the mileage since 1904. Assuming the total mileage of public roads to have been the same in 1904 as was reported in 1909, the gain for the five-year period would be only 5.16 per cent.

There are 6 counties in the State which report no improved roads, 20 counties have less than 10 per cent improved, 6 counties have between 10 and 20 per cent improved, and 3 counties have between 20 and 30 per cent improved. The counties which have 30 per cent and over improved are as follows: Williamsburg, 30; Abbeville, 30.1; Bamberg, 31.24; Calhoun, 33.33; Dorchester, 33.33; Darlington, 46.66; and Richland, 64.35 per cent.

Richland County, which reports 448 miles of sand-clay roads, was one of the first counties in the United States to adopt this type of construction, and the progress which South Carolina and other States have made along this line is largely due to the success of the work in Richland County.

COST DATA.

The cost data for South Carolina are shown in Table 73.

Sand-clay roads cost from \$250 to \$1,000 per mile, with an average for the 18 counties reporting of \$415 per mile. These roads vary in width from 16 to 30 feet, while the average for the counties from which reports were received is 23 feet.

The average cost of sand-clay roads in Richland County is \$400 per mile.

Only 3 counties furnished information in regard to the cost of gravel roads, and the average was \$1,133 per mile. Macadam roads vary in cost in the 5 counties reporting from \$1,800 to \$7,000 per mile, with an average of \$3,252 per mile.

SOUTH DAKOTA.

MILEAGE DATA.

The information for South Dakota was secured from the county auditors of the various counties and was checked up by Mr. Samuel H. Lee, State engineer.

The total mileage of public roads reported for 1909 was 56,354 (Table 74), which is less by 2,941 miles than the total given for 1904. This discrepancy is probably due to the fact that a number of the counties overestimated the mileage in 1904.

Of the total mileage of public roads in 1909, 147 miles are reported surfaced with gravel, 10 miles with stone, and 129 miles with sand-clay, making a total of 286 miles of improved road or 0.5 per cent. The gravel-road mileage is the same in 1909 as for 1904, that is, 147 miles. During the five-year period 129 miles of sand-clay and 6 miles of macadam roads have been constructed.

It appears from the returns that 50 counties report no improved roads, while 13 counties have less than 10 per cent improved.

TENNESSEE.

MILEAGE DATA.

The information for Tennessee was furnished principally by county court clerks, and was checked up by Mr. George H. Ashley, State geologist.

According to Table 75 there were 45,913 miles of public roads in the State at the close of 1909. The total mileage for 1904 exceeds the total reported for 1909 by 3,076 miles, which is probably due to an overestimate from a number of the counties in 1904. Of the total mileage of public roads in the State in 1909, 2,684 miles were surfaced with stone, 2,542.5 miles with gravel and 127 miles with sand-clay, making a total of 5,353.5 miles, or 11.66 per cent of the roads improved. The gain in improved roads for the five-year period from 1904 to 1909 was 910 miles of stone, 31.5 miles of gravel, and 127 miles of sand-clay, making a total gain of 1,068.5 miles, which would indicate that 2.91 per cent of the public roads have been improved during the period from 1904 to 1909.

Thirty-one counties report no improved roads, 35 counties have less than 10 per cent improved, 11 counties have between 10 and 20 per cent improved, and 8 counties have between 20 and 30 per cent improved. The counties reporting more than 30 per cent improved are as follows: Hamblen, 32; White, 32.43; Jefferson, 34.33; Madison, 38.4; Maury, 38.99; Davidson, 40.33; Sumner, 41.66; Rutherford, 45; Smith, 47.5; Bradley, 55.38; and Marshall, 58 per cent.

The progress in road building in Tennessee is due largely to the fact that a number of counties in different parts of the State have issued bonds for this purpose. This activity has been largely confined to the eastern part of the State, but the central portion has been fairly well supplied with stone roads for a number of years.

COST DATA.

The cost data for Tennessee are shown in Table 76.

Sand-clay roads are reported as costing from \$400 to \$1,500 per mile, with an average for the 3 counties reporting of \$1,050 per mile. The average width of sand-clay roads is about 14 feet, and the average depth of material from 6 to 8 inches.

Gravel roads are reported as costing from \$400 to \$5,000 per mile, with an average for the 15 counties reporting of \$1,697 per mile. Gravel roads have an average width of 14 feet and an average depth of material of 7 inches.

The cost of macadam roads varies from \$700 to \$5,100 per mile, and the average for the 22 counties reporting is \$2,727 per mile. The average width of macadam surface is 13 feet and the average depth of material, consolidated, 7 inches. The cost of macadam roads in Sumner and Williamson Counties is reported as \$700 and \$800, respectively. It is quite evident that roads built at that cost, however, are not high-grade macadam roads, but are probably built by simply crushing the rock, piling it on the old roadbed, and leaving it for the traffic to consolidate.

TEXAS.

MILEAGE DATA.

The mileage data for Texas were secured from county clerks, county judges, and county surveyors, and were checked up by Mr. Robert J. Potts, of the Agricultural and Mechanical College of Texas.

As shown by Table 77, there were, at the close of 1909, 128,971 miles of public roads in the State, which is 7,562 miles more than were reported in 1904. This increase in mileage is caused partly by the fact that a number of new counties have been established and that many new roads in different parts of the State have been opened up.

Of the total mileage of public roads, 365.25 miles are reported as having been surfaced with stone, 2,126 miles with gravel, 2,253.75 miles with sand-clay, 126 miles with shell, and 25 miles with shell screening, making a total of 4,896 miles of improved roads, which represents 3.8 per cent of the total. The gain in improved roads of the various types is as follows: 198.25 miles of stone, 217 miles of gravel, 74 miles of shell, and 25 miles of shell screening. There were no sand-clay roads reported in 1904. The total gain in improved roads, therefore, is 2,768 miles, or 2.05 per cent for the five-year period.

There are 140 counties in the State which report no improved roads, and 81 counties with less than 10 per cent of roads improved, while 13 counties report from 10 to 20 per cent improved. The counties reporting more than 20 per cent improved are as follows: Starr, 21.42; Aransas, 22.72; Mason, 25; Comal, 26.66; Jackson, 26.66; Tarrant, 27.5; Liberty, 30; Guadalupe, 31.85; Jack, 32.3; Montgomery, 40; and Webb, 54.11 per cent. The counties which appear to have made the greatest progress in road building, however, are Bexar, Dallas, Harris, Tarrant, and Travis.

COST DATA.

Cost data for Texas are shown in Table 78.

The cost of earth roads varies from \$60 to \$400 per mile. The average for the 5 counties reporting is \$168 per mile.

The cost of sand-clay roads varies from a minimum of \$60 per mile to a maximum of \$2,000 per mile. The average for the 41 counties reporting is \$593 per mile. The sand-clay roads are surfaced to a width of about 20 feet, and the sand-clay mixture is placed to a depth of from 8 to 12 inches.

The average cost of shell roads for the 3 counties reporting is \$3,083 per mile, with an average width of 14 feet and an average depth of material of 10 inches.

The average cost of gravel roads for the 27 counties reporting is \$1,708; the maximum cost is given as \$4,000 and the minimum as \$100.

Five counties furnish information in regard to the cost of macadam roads; the minimum cost is reported as \$1,000, the maximum \$3,500, and the average \$2,160 per mile. Macadam roads vary in width from 12 to 18 feet and in depth from 6 to 8 inches.

El Paso County reports that bituminous roads are being built at a cost of about \$6,000 per mile.

UTAH.

MILEAGE DATA.

The information for Utah was secured principally from county clerks and county surveyors, and was checked up by Mr. David Mattson, who is treasurer of the State and also a member of the State road commission. Mr. Mattson also rendered valuable assistance in securing a part of the information from the various counties.

The total mileage of public roads in 1909 was 8,320 (Table 79), which exceeds the total reported for 1904 by 1,230 miles. This discrepancy is probably due to the fact that a number of roads have been laid out during the five-year period, and that correspondents in a number of counties underestimated the mileage in 1904.

Of the total mileage of public roads, 1,018 are reported to have been improved. Of this mileage, 0.5 mile was surfaced with bituminous-macadam, 42 miles with plain macadam, 332 miles with gravel, and 643.5 miles with sand-clay. There were no sand-clay roads reported for 1904, and, as the mileage of gravel roads for 1904 exceeds the mileage reported for 1909 by 265 miles, it is assumed that quite a number of the roads which were classified as gravel roads in 1904 were classified as sand-clay roads in 1909. It will be seen from these figures that 12.23 per cent of the roads of the State are reported as improved, which exceeds the percentage reported for 1904 by 3.66 per cent.

Six counties in the State report no improved roads, 10 counties have less than 10 per cent improved, 4 counties have between 10 and 20 per cent improved, and 4 counties have between 20 and 30 per cent improved. The counties having more than 30 per cent improved are as follows: Weber, 31.46; Sevier, 42; and Salt Lake, 59.57 per cent.

It will be seen that in spite of its dry climate and sparse population Utah has made considerable progress in the improvement of its public roads.

COST DATA.

Table 80 indicates that in Utah sand-clay roads are being built at a cost of from \$160 to \$3,000 per mile, while the average for the 6 counties from which reports were received is \$718 per mile. Carbon County reports that sand-clay roads are being built at a cost of 20 cents per cubic yard, and that their width is from 18 to 40 feet.

Gravel roads vary in cost from \$500 to \$5,000 per mile, with an average for the 4 counties reporting of \$2,188 per mile, while the width varies from 15 to 25 feet. Beaver County reports that these roads are costing \$0.45 per square yard in that county.

Salt Lake and Uinta Counties both report the cost of macadam roads as \$5,000 per mile, but no information is given in regard to the width and depth.

VERMONT.

MILEAGE DATA.

Information regarding the mileage of roads improved between 1903 and 1909, inclusive, was furnished by Mr. M. E. Shedd, who is connected with the State highway department and who is also a special agent of this office. To the information furnished by Mr. Shedd, the mileage statistics contained in Bulletin No. 32 for Vermont have been added. The State highway department vouches for the accuracy of the figures for the seven-year period from 1903 to 1909, but was unable to check up the mileage reported previous to that time. (Table 81.)

From this information it appears that there were, at the close of 1909, 14,406 miles of country roads in the State; of this mileage 466.65 miles were surfaced with stone and 2,183.98 miles with gravel, making a total of 2,650.63 miles of improved roads, or 18.4 per cent of the total.

The gain in improved roads is as follows: 185.65 miles of macadam and 511.48 miles of gravel, making a total gain for the seven-year period of 697.13 miles, or 4.95 per cent.

Every county in the State reported some improved roads; 3 counties report less than 10 per cent improved; 5 counties report between 10 and 20 per cent improved; while 6 counties reported over 20 per cent improved, as follows: Washington, 23.8; Addison, 27.85; Chittenden, 30.66; Bennington, 32.58; Rutland, 38.02; and Grand Isle, 56.65 per cent.

COST DATA.

The State highway department is authority for the statement that the average cost of gravel roads in Vermont is about \$1,600 per mile and of telford gravel, \$2,500 per mile. The width of gravel and telford gravel roads is about 12 feet, with shoulders about 4 feet wide on each side, making a total width from ditch to ditch of 20 feet. The gravel roads are surfaced to a depth of about 8 inches and the gravel telford to a depth of about 15 inches.

VIRGINIA.

MILEAGE DATA.

The information for Virginia was secured from county court clerks and was checked up by Mr. P. St. J. Wilson, State highway commissioner. The total mileage of public roads reported for 1909 was 43,399 miles (Table 82), which is less than the mileage reported for 1904 by 8,413 miles. A number of counties overestimated the total mileage in 1904. Of the improved roads 1,011.5 miles are reported as having been surfaced with stone, 610.75 miles with gravel, 185.5 miles with sand-clay, 91 miles with shell, and 4 miles with bituminous-macadam, making a total of 1,902.75 miles of improved roads, which represents 4.38 per cent of the total.

The gain in improved roads for the five-year period from 1904 to 1909 is as follows: 256.5 miles of stone, 185.5 miles of sand-clay, and 4 miles of bituminous-macadam, making a total of 302.75 miles improved, or 1.29 per cent of the total. There was a slight reduction in the mileage of gravel roads reported.

There are 32 counties in the State which report no improved roads; 54 counties have less than 10 per cent improved, 7 counties have from 10 to 19 per cent, and 7 counties have 20 per cent and over improved, as follows: Chesterfield, 20; Dinwiddie, 24; Clarke, 26.66; Alexandria, 31; Greenville, 42.04; Elizabeth City, 45.33; and Henrico, 46.88 per cent.

COST DATA.

The cost data for Virginia are contained in Table 83.

Dickenson County reports that earth roads are costing about \$500 per mile, with a width of 12 feet from ditch to ditch, while Halifax County reports the cost of earth roads to be about \$700 per mile for a width of 16 feet.

Sand-clay roads vary in cost from \$400 to \$800 per mile, with an average cost for the 7 counties reporting of \$607 per mile.

The minimum cost of gravel roads is \$800 and the maximum cost \$5,000, with an average of \$2,200 for the 6 counties reporting. The gravel roads are surfaced to a width of from 12 to 16 feet.

Macadam roads vary from \$1,750 to \$7,000 per mile, and the average for the 27 counties reporting is \$4,920 per mile. Macadam roads are surfaced to a width of from 12 to 16 feet and to a depth of from 6 to 8 inches.

WASHINGTON.

MILEAGE DATA.

The information for Washington was secured from county engineers and county surveyors, and was checked up by Mr. Henry L. Bowlby, State highway commissioner. Mr. Bowlby also rendered valuable service in securing the statistics from the various counties.

The total mileage of public roads, as reported for 1909, was 34,283.6 miles (Table 84), which exceeds the total for 1904 by 2,285.6 miles. This increase is probably due to the fact that a number of roads have been laid out in different parts of the State during the five-year period. The total mileage of improved roads for 1909 was 4,520.68 miles, of which 100.41 miles are reported as having been surfaced with stone, 3,178.92 miles with gravel, 1,223.45 miles with sand-clay, and 17.9 miles with bituminous-macadam. The increased mileage for the different types of improved roads is as follows: 51.91 miles of macadam, 1,250.92 miles of gravel, 1,223.45 miles of sand-clay, and 17.9 miles of bituminous-macadam, making a total gain for the five-year period of 2,544.18 miles.

Of the total mileage of public roads in 1909, it will be seen that 13.19 per cent were improved, which represents a gain over 1904 of 7.01 per cent.

There are 11 counties in the State which reported no improved roads, while 11 counties report less than 10 per cent improved, and 4 counties report between 10 and 20 per cent improved. The counties reporting more than 20 per cent improved are

as follows: Clallam, 22.5; Wahkiakum, 31.73; Skagit, 36.89; Clarke, 42.6; San Juan; 51.06; King, 51.09; Thurston, 51.66; Snohomish, 55.06; Mason, 60; Pierce, 69.77; Whatcom, 79.68; and Chehalis, 91 per cent.

COST DATA.

Cost data for Washington are contained in Table 85.

The average cost of gravel roads for the 7 counties reporting is \$2,600 per mile. The gravel roads vary in width from 9 to 12 feet and in depth from 3 to 9 inches. Douglas County reports that gravel roads are being built at a cost of 30 cents per cubic yard, while San Juan County reports the cost to be 30 cents per square yard.

The average cost of macadam roads for the 3 counties reporting is \$7,600 per mile. All of these roads are surfaced to a width of 16 feet. King County reports that macadam roads are costing about 85 cents per square yard, while Walla Walla County reports the cost to be about \$1 per square yard.

WEST VIRGINIA.

MILEAGE DATA.

The information for West Virginia was secured from county engineers and county clerks, and was checked up by Mr. Edward D. Baker, chief engineer of the State highway department. The State highway department also rendered valuable assistance in collecting information from the various counties.

The total mileage of public roads for 1909 was 32,109 miles, which exceeds the total for 1904 by 5,931 miles. This discrepancy is evidently due to an underestimate in 1904. At the close of 1909 there were reported 591.4 miles of improved roads, and of these 543.9 miles were surfaced with stone, 14 miles with sand-clay, and 33.5 miles with gravel. The gain in improved roads for the five-year period was as follows: 326.9 miles of stone, 14 miles of sand-clay, and 7 miles of gravel, which, with the loss of 11 miles of brick roads reported in 1904, makes a total gain of 336.9 miles.

It will be noticed from Table 86 that 307 miles of road are reported as dragged with a split-log drag. These are not classified, however, as improved roads, as the effects of dragging are only temporary and the work must be kept up if the road is to be maintained in good condition.

It will be seen from Table 86 that 1.84 per cent of the roads of the State were improved at the close of 1909, and this exceeds the percentage for 1904 by .87 per cent.

Thirty-six counties in the State report no improved roads and 15 counties report less than 10 per cent, while 4 counties report over 10 per cent improved, namely: Marshall, 10.76; Berkeley, 14.25; Jefferson, 53.33; and Ohio, 77.5 per cent.

COST DATA.

The cost data for West Virginia are contained in Table 87.

The average cost of earth-road building for the 3 counties reporting is \$742 per mile.

Macadam roads vary in cost from \$2,400 to \$10,000 per mile. The average for the 11 counties reporting is \$5,414 per mile. The average width of macadam roads is 12 feet.

McDowell County reports that macadam roads built with paid labor cost about \$4,000 per mile, but where they are built with convict labor the cost is about \$1,300 per mile.

The average cost of brick roads in Ohio and Brooke Counties is \$14,500 per mile.

WISCONSIN.

MILEAGE DATA.

Mileage statistics for Wisconsin were furnished by Mr. A. R. Hirst, State highway engineer.

The total mileage of public roads at the close of 1909, as reported by Mr. Hirst, was 61,090 miles, which is less than the total reported for 1904 by 2,503 miles. The total of improved roads for 1909 was 10,167.33 miles (Table 88), of which 659.33 miles were surfaced with stone, 8,494 miles with gravel, 1,013 miles with sand-clay, and 1 mile with bituminous-macadam. There were no sand-clay roads reported in 1904 and, as the mileage of gravel roads was less in 1909 than in 1904, it is assumed that the classification has been changed by reporting some of the roads as sand-clay rather than gravel. The percentage of roads improved is practically the same as that reported for 1904, that is, 16.64 per cent.

Every county in the State except two reports some improved roads. Thirty-seven counties have less than 10 per cent improved, 13 counties report between 10 and 19 per cent improved, and 6 counties report between 20 and 29 per cent improved. The counties reporting over 30 per cent improved are as follows: Manitowoc, 31.68; Brown, 34.77; Fond du Lac, 38.16; Kewaunee, 40.89; Racine, 42.06; Walworth, 45.31; Milwaukee, 49.36; Waukesha, 53.33; Ozaukee, 60.18; Washington, 61.49; Calumet, 70.5; Sheboygan, 72.22; and Winnebago, 74.05 per cent.

COST DATA.

The cost data for Wisconsin are contained in Table 89.

The average cost of sand-clay roads for the two sections reported is \$800 per mile.

The cost of gravel roads varies from \$250 to \$2,100 per mile, with an average for the 14 counties and townships reporting of \$1,135 per mile.

Macadam roads vary in cost from \$2,000 to \$5,986 per mile, and the average cost for the 14 counties and townships reporting is \$2,978 per mile.

It was impossible to obtain information in regard to the width and depth of material and other details of construction for roads in this State.

WYOMING.

MILEAGE DATA.

The mileage data for Wyoming were secured from county clerks, county surveyors, and county supervisors of the various counties. The returns were checked up by Mr. Clarence D. Johnson, State engineer.

The total mileage of public roads reported for 1909 was 10,569 miles (Table 90), which exceeds the total for 1904 by 122 miles. There were practically no stone or gravel roads reported for 1909 or for 1904 except in the Yellowstone National Park.

There are 416 miles of Government roads in the Yellowstone National Park and the adjacent national forests. These are constructed and maintained by the National Government, and as most of them are surfaced with gravel, crushed stone, and selected soil, they should be classified as improved roads.

While no stone or gravel roads were reported for the State, the roads are generally good, since the rainfall is light, the soil porous, and the traffic not very heavy. In many parts of the State the soil is gravelly, so that with very little work the roads can be constructed and maintained in such a way as to meet the present needs. The chief difficulty encountered by the road builder in Wyoming is that of properly locating the roads and providing suitable bridges and culverts.

There are quite a number of mountain roads in different parts of the State which were built at considerable expense on account of the extensive grading and the culverts and bridges, but these roads do not appear on the records as improved roads, though for all intents and purposes they should be so classified.

Thus while the returns from Wyoming show a small percentage of modern improved roads, it should not be inferred that the road condition of the State is especially bad. A road is not bad as long as it answers the need of present traffic, and the majority of the roads of this State are in this class.

APPENDIX.

This Appendix includes mileage and cost statistics for the year ending December 31, 1909. The mileage statistics are presented by counties and the cost data by counties and townships.

TABLE 3.—Public-road mileage in the United States in 1904 and 1909.

State.	Total mileage.		Mileage of improved roads.						Percentage of all roads improved.			
	1904	1909	Stone.		Gravel.		Other materials.		1904	1909		
			1904	1909	1904	1909	1904	1909				
Alabama.....	50,089	49,630	392.5	683.50	1,261.5	1,398.43	66	1,182	1,720	3,263.93	3.43	6.58
Arizona.....	3,387	5,987	1	.....	216	248	.....	25	217	273	3.02	4.56
Arkansas.....	36,445	36,445	55	170	181	537.25	.....	378	236	1,085.25	.04	2.97
California.....	46,653	48,069	418.5	579.25	5,843.5	6,054	2,541	1,954.50	8,803	8,587.75	18.87	17.87
Colorado.....	30,214	29,693	57	14	121	306.50	.....	.....	178	320.50	.59	1.08
Connecticut.....	14,088	12,583	463.5	665.62	1,896.5	774.40	.....	1,590.52	2,360.1	3,030.51	16.75	24.08
Delaware.....	3,000	3,000	14	96.36	2	49	50	41.07	66	186.44	2.20	6.22
Florida.....	17,374	17,579	345	278.25	17.5	239.60	523	1,914.50	885.5	1,752.35	5.10	9.97
Georgia.....	57,203	82,230	438	522	659	880.50	537	4,575.50	1,634	5,978	2.86	7.27
Idaho.....	18,163	18,403	17	17	195	95.50	.....	398	212	510.50	1.16	2.77
Illinois.....	94,141	94,141	1,065.5	1,891.4	6,800	.....	.....	.....	7,924	8,914	8.42	9.47
Indiana.....	68,306	67,996	3,295	4,398.25	20,582	20,508.75	17.5	48.75	23,877	24,555.75	34.96	36.70
Iowa.....	102,448	102,427	241	357.25	1,403	1,572.85	20	575	1,664	2,505.10	1.62	2.45
Kansas.....	101,196	98,302	111.7	136.95	158.5	27.75	3	210.01	273.2	374.71	.27	.38
Kentucky.....	57,137	53,744	8,078	8,709.25	1,408	1,404	.....	1.70	9,486	10,114.95	16.60	18.82
Louisiana.....	24,967	24,962	.....	98.34	26	82.50	8	247	34	329.50	.14	1.32
Maine.....	25,528	25,528	840	1,222.80	236	2,493.75	250	110.97	2,323.5	2,703.06	9.10	10.59
Maryland.....	16,773	16,773	840	1,222.80	480	488	.....	431.50	1,570	2,142.30	9.36	12.77
Massachusetts.....	17,092	17,272	1,212.7	2,296.66	6,621.1	6,166.52	10	.....	7,843.8	8,463.18	45.89	49.00
Michigan.....	69,296	68,906	248.5	747.81	6,777	3,770.58	.....	2,382.15	7,025.5	6,900.54	10.14	10.01
Minnesota.....	79,324	79,323	67.5	137.35	6,179	4,228	1	1,051.50	6,247.5	5,416.85	7.87	6.83

Mississippi.....	38,698	39,619	52.50	109	165.75	40	124	149	342.25	.31	.86
Missouri.....	108,133	107,923	1,240.75	1,871.5	3,512.50	.....	2.25	2,733	4,755.50	2.53	4.40
Montana.....	23,319	23,319	94.50	66	94.50	.....	.....	65	96	.28	.41
Nebraska.....	79,462	80,338	52.50	.....	.50	6	195.55	23	248.55	.03	.31
Nevada.....	12,585	12,751	1	60	45	.....	.....	64	46	.51	.36
New Hampshire.....	15,116	15,116	201.82	1,175	1,246.06	.....	.....	1,293	1,448.48	8.55	9.58
New Jersey.....	14,842	14,842	2,594.09	481.5	572.44	39.8	211.33	2,422.3	3,377.86	16.32	22.76
New Mexico.....	15,326	16,920	25	2	8	.....	71	2	104	.01	.61
New York.....	75,798	79,279	4,014.40	3,692	8,172.96	.....	.....	5,876	12,787.36	7.96	16.13
North Carolina.....	49,763	48,285	1,038.50	422	545	438	729.50	1,259	2,313	2.53	4.79
North Dakota.....	59,332	61,593	.....	205	140	.....	.....	212	140	.36	.23
Ohio.....	69,439	88,861	9,687	16,159	14,188	140.5	231	23,460	24,106	33.79	27.13
Oklahoma.....	43,554	71,325	23.50	.....	141.50	.....	196	.....	361	.....	.50
Oregon.....	34,258	29,475	451.25	2,235	1,871	145	477	2,580	2,709.25	7.56	9.40
Pennsylvania.....	99,777	87,386.79	2,764.01	.....	436.10	.....	108.65	2,100.8	3,364.76	2.17	3.84
Rhode Island.....	2,361	2,120.75	409.10	774.5	605	.....	27.97	1,021.5	1,042.07	43.27	49.14
South Carolina.....	41,830	32,075	133.75	179	131	1,630	3,250	1,878	3,534.75	4.49	11.02
South Dakota.....	59,235	56,354	10	147	147	.....	129	151	286	.25	.50
Tennessee.....	48,989	45,913	2,084	2,511	2,542.50	.....	127	4,285	5,353.50	8.75	11.66
Texas.....	121,409	128,971	365.25	1,909	2,126	52	2,404.75	2,128	4,896	1.75	3.80
Utah.....	7,090	8,320	42	597	332	.....	644	608	1,018	8.57	12.23
Vermont.....	14,321	14,406	406.65	1,672.5	2,183.98	.....	.....	1,953.5	2,650.63	13.45	18.40
Virginia.....	51,812	43,399	1,011.50	729	610.75	125	280.50	1,900	1,902.75	3.09	4.38
Washington.....	31,998	34,283.60	100.41	1,928	3,178.92	.....	1,241.35	1,976.5	4,520.68	6.17	13.19
West Virginia.....	26,178	22,100	543.90	26.5	33.50	11	14	254.5	591.40	.97	1.84
Wisconsin.....	63,593	61,090	659.33	9,900	8,494	.....	1,014	10,633.2	50,167.33	16.72	16.64
Wyoming.....	10,447	10,569	.....	.....	.....	153	416	153	416	1.46	3.94
Totals and averages.....	2,151,379	2,139,645.14	59,237.35	109,905.1	102,870.44	6,806.8	28,372.52	153,539.4	190,476.32	7.14	8.66

1 This includes gravel roads.

TABLE 4.—Mileage of sand-clay roads in the United States in 1904 and 1909.

State.	1904	1909	State.	1904	1909
Alabama.....	12	1,107	Nebraska.....	6	179.75
Arizona.....		25	New Mexico.....		71
Arkansas.....		378	North Carolina.....	438	729.5
California.....		1,289	Oklahoma.....		196
Connecticut.....		1,214.25	Oregon.....		345
Delaware.....		6.08	Rhode Island.....		6
Florida.....	435	1,016.5	South Carolina.....	1,575	3,218
Georgia.....	513	4,326.5	South Dakota.....		129
Idaho.....		398	Tennessee.....		127
Iowa.....		575	Texas.....		2,253.75
Kansas.....		202.25	Utah.....		643.5
Louisiana.....		168	Virginia.....		185.5
Maryland.....		23	Washington.....		1,223.45
Michigan.....		2,381.65	West Virginia.....		14
Minnesota.....		1,051.5	Wisconsin.....		1,013
Mississippi.....		103	Total.....	2,979	24,601.42
Missouri.....		12.25			

¹ Approximately.

TABLE 5.—Average cost per mile of improved roads in various States in 1909.

State.	Sand-clay.	Gravel.	Macadam.	Bituminous.
	Dollars.	Dollars.	Dollars.	Dollars.
Alabama.....	680	1,483	2,525	¹ 13,250
Arkansas.....		940	3,250	
California.....	412	1,375	5,375	8,575
Colorado.....		1,475		
Connecticut.....		5,412	² 8,220	
Delaware.....		(³)	6,850	10,120
Florida ⁴	829	3,900	⁶ 3,112	
Georgia.....	387	1,200	2,275	
Indiana.....		1,887	2,657	
Kansas.....	785		4,070	
Kentucky.....		1,011	2,158	
Louisiana ⁷	654	2,100		
Maine.....		3,687	9,022	⁸ 19,681
Maryland ⁹	1,775	1,000	8,192	
Massachusetts.....			7,451	¹⁰ 9,714
Michigan.....		1,843	4,346	
Minnesota.....	766	946	3,280	
Mississippi.....		2,058	5,135	
Missouri.....		1,023	3,388	
Montana.....	(¹¹)	¹ 800		
Nebraska.....	933		¹ 6,000	¹ 8,448
New Hampshire.....		2,352	5,016	
New Jersey.....		4,317	8,746	9,930
New York.....		5,950	9,496	
North Carolina.....	506	1,096	4,020	
Ohio.....	(¹²)	1,909	4,580	7,766
Oklahoma.....	389		3,750	
Oregon.....		1,940	3,491	
Pennsylvania.....		1,575	9,164	10,000
Rhode Island.....			(¹³)	(¹⁴)
South Carolina.....	415	1,133	3,252	
Tennessee.....	1,050	1,697	2,727	
Texas ¹⁵	593	1,708	2,160	¹ 6,000
Utah.....	718	2,188	5,000	
Vermont.....		¹⁶ 1,600		
Virginia.....	607	2,200	4,920	
Washington.....		2,600	7,600	
West Virginia.....			5,414	(¹⁷)
Wisconsin.....	800	1,135	2,978	
Average.....	723	2,047	4,989	10,348

¹ For 1 section of road only.² Average cost of telford macadam, \$11,323.47; telford gravel, \$7,659.71 per mile.³ \$0.15 per square yard.⁴ \$0.25 per square yard.⁵ Average cost of shell roads, \$3,186.⁶ Marl and coral, sometimes referred to as cocoina.⁷ Average cost of shell roads, \$3,000.⁸ Some of these roads are 40 feet in width.⁹ Average cost of shell roads, \$2,984 per mile.¹⁰ Average cost of 3 sand and oil roads, \$4,718.66 per mile.¹¹ \$0.23 per square yard.¹² Average cost of brick roads, \$12,381 per mile.¹³ 80 cents per square yard.¹⁴ \$1.25 per square yard.¹⁵ Average cost of shell roads, \$3,083 per mile.¹⁶ Telford gravel roads, \$2,500 per mile.¹⁷ Average cost of brick roads, \$14,500 per mile.

ALABAMA.

TABLE 6.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads:				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Autauga.....	200		10		20	10.00
Baldwin.....	200			78	78	39.00
Barbour.....	1,500			100	100	6.66
Bibb.....	500		5	50	55	11.00
Blount.....	660		7		7	1.06
Bullock.....	656		20	25	45	6.86
Butler.....	600					
Calhoun.....	850	.5	10	1.5	12	1.41
Chambers.....	1,000					
Cherokee.....	700		350		350	50.00
Chilton.....	715					
Choctaw.....	775					
Clarke.....	750					
Clay.....	1,000					
Cleburne.....	700					
Coffee.....	250					
Colbert.....	528	100			100	18.93
Conecuh.....	500			86	86	17.20
Cook.....	660					
Covington.....	1,150					
Crenshaw.....	488					
Cullman.....	800					
Dale.....	617			66	66	10.69
Dallas.....	1,000		30	2	32	3.20
Dekalb.....	800		20	10	30	3.75
Elmore.....	1,000					
Escambia.....	700					
Etowah.....	700		155		155	22.14
Fayette.....	850		5		5	.58
Franklin.....	700					
Geneva.....	1,000					
Greene.....	300		5	50	55	18.33
Hale.....	200		1		1	.50
Henry.....	1,000					
Houston.....	700			5	5	.71
Jackson.....	500	80	40		120	24.00
Jefferson.....	950	250			250	26.31
Lamar.....	1,140		15	20	35	3.07
Lauderdale.....	600		40		40	6.66
Lawrence.....	600					
Lee.....	600					
Limestone.....	650	10	50		60	9.23
Lowndes.....	500		9	1	10	2.00
Macon.....	300					
Madison.....	300	80	125		205	68.33
Marengo.....	442					
Marion.....	800					
Marshall.....	1,000		10		10	1.00
Mobile.....	1,600		95	100	1,270	16.87
Monroe.....	1,400			3	3	.21
Montgomery.....	597		253.43	59.5	312.93	52.41
Morgan.....	574	60			60	10.45
Perry.....	400					
Pickens.....	640					
Pike.....	1,010			225	225	22.27
Randolph.....	800					
Russell.....	600					
St. Clair.....	672	80			80	11.90
Shelby.....	325					
Sumter.....	600			100	100	16.66
Talladega.....	800		50		50	6.25
Tallapoosa.....	2,000					
Tuscaloosa.....	1,140	20	83	115	218	19.12
Walker.....	850					
Washington.....	500					
Wilcox.....	1,500	3	10		13	.86
Winston.....	500					
Total.....	49,639	683.5	1,398.43	1,107	1 3,263.93	6.58

¹ This includes 75 miles of shell roads.

TABLE 6.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	50,089	392.5	1,261.50	12	11,720	3.43
1909.....	49,639	683.5	1,398.43	1,107	2 3,263.93	6.58
Gain.....		291	136.93	1,095	1,543.93	3.15

¹ Includes 50 miles of shell roads and 4 miles of chert roads. ² This includes 75 miles of shell roads.

TABLE 7.—*Cost data, 1909.*

County.	Average cost per mile.				
	Earth.	Sand-clay.	Gravel.	Macadam.	Bituminous.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Baldwin.....	175				
Blount.....	200		800		
Calhoun.....		400		2,500	
Crenshaw.....		500			
Dale.....		750			
Etowah.....			650		
Jackson.....			1,250		
Jefferson.....	300			2,500	13,250
Madison.....			750	1,500	
Montgomery.....		¹ 1,350	² 4,950		
Morgan.....				3,600	
Pike.....		680			
Tuscaloosa.....		400	500		
Average.....	225	680	1,483	2,525	13,250

¹ Cost varies from \$700 to \$2,000 per mile.

² Gravel roads, including heavy grading, culverts, and wooden bridges, from \$900 to \$7,000 per mile, depending largely on length of haul and surfacing material.

ARIZONA.

TABLE 8.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
Apache.....	400	50		50	12.50
Cochise.....	600	² 22		² 22	3.66
Cocconino.....	400	4	3	7	1.74
Gila.....	260				
Graham.....	250	3		3	1.20
Maricopa.....	900	34		34	3.77
Mohave.....	550				
Navajo.....	142		12	12	8.45
Pima.....	500				
Pinal.....	400				
Santa Cruz.....	150				
Yavapai.....	800	10	10	20	2.50
Yuma.....	635	125		125	19.68
Total.....	5,987	³ 248	25	³ 273	4.56

¹ Greenlee County established in January, 1911, from part of Graham County.

² Oiled.

³ Includes 22 miles of oiled roads.

TABLE 8.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
1904.....	5,987	216	.....	1 217	3.62
1909.....	5,987	2 248	25	2 273	4.56
Gain.....		32	25	56	.94

¹ Includes 1 mile of stone road.² Includes 22 miles of oiled roads.

ARKANSAS.

TABLE 9.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Arkansas.....	900					
Ashley.....	600					
Baxter.....	450		25		25	5.55
Benton.....	1,000		25	100	125	12.50
Boone.....	200					
Bradley.....	250					
Calhoun.....	200					
Carroll.....	350					
Chicot.....	277					
Clark.....	780		94	4	98	12.56
Clay.....	500		5		5	1.00
Cleburne.....	450					
Cleveland.....	235					
Columbia.....	602					
Conway.....	400	4	5		9	2.25
Craighead.....	350		80		80	22.85
Crawford.....	711					
Crittenden.....	200					
Cross.....	252					
Dallas.....	800		3		3	1.19
Desha.....	270					
Drew.....	1,000		18		18	1.80
Faulkner.....	525	2			2	.38
Franklin.....	726					
Fulton.....	150					
Garland.....	500		10		10	2.00
Grant.....	475					
Greene.....	683		18		18	2.63
Hempstead.....	500					
Hot Spring.....	400					
Howard.....	400		25		25	6.25
Independence.....	736	2	25		27	3.66
Izard.....	700					
Jackson.....	500	1			1	.20
Jefferson.....	200	10	10	10	30	15.00
Johnson.....	300					
Lafayette.....	281					
Lawrence.....	300	5	5		10	3.33
Lee.....	420					
Lincoln.....	310		4		4	1.29
Little River.....	289					
Logan.....	575					
Lonoke.....	850	10	1		11	1.29
Madison.....	1,000					
Marion.....	400		20		20	5.00
Miller.....	100					
Mississippi.....	162					
Monroe.....	200					
Montgomery.....	800					
Nevada.....	300					
Newton.....	750					
Ouachita.....	500		3		3	.60
Perry.....	125	2	4	10	16	12.80

TABLE 9.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Phillips.....	490					
Pike.....	405					
Poinsett.....	250					
Polk.....	434					
Pope.....	300		2.25		2.25	0.75
Prairie.....	734					
Pulaski.....	583	90	73	194	357	61.23
Randolph.....	1,000		5		5	.50
St. Francis.....	500					
Saline.....	300		20	20	40	13.33
Scott.....	200					
Searcy.....	364					
Sebastian.....	856	36	3		39	4.58
Sevier.....	330		12	40	52	15.75
Sharp.....	300					
Stone.....	240					
Union.....	500					
Van Buren.....	800					
Washington.....	1,150	4	3		7	.60
White.....	805	4	4		8	.99
Woodruff.....	120					
Yell.....	846		35		35	4.13
Total.....	36,445	170	537.25	378	1,085.25	2.97

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	36,445	55	181		236	0.64
1909.....	36,445	170	537.25	378	1,085.25	2.97
Gain.....		115	356.25	378	849.25	2.33

TABLE 10.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Earth.	Gravel.	Macadam.		Earth.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.		Dollars.	Dollars.	Dollars.
Clark.....		350		Sebastian.....			2,500
Conway.....			1,000	Sevier.....		650	
Craighead.....		800		Washington.....			3,500
Drew.....		350		Yell.....	250	500	
Garland.....	200			Average.....	225	940	3,250
Independence.....		3,000	6,000				

CALIFORNIA.

TABLE 11.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Oiled.	Total.	
Alameda.....	765	25	400			425	55.55
Alpine.....	100						
Amador.....	500	15	20			35	7.00
Butte.....	1,200	5	400			405	33.75
Calaveras.....	606	5	40			45	7.42
Colusa.....	578		302			302	52.24
Contra Costa.....	500		100	10	40	150	30.00
Del Norte.....	125		30			142.5	34.00
Eldorado.....	900			5		5	.55
Fresno.....	1,500			20	150	170	11.33
Glenn.....	500		138			138	27.60
Humboldt.....	1,130	10	300	105		415	36.72
Imperial.....	726						
Inyo.....	500						
Kern.....	1,100	2			100	102	9.27
Kings.....	500				92	92	18.40
Lake.....	488		160			160	32.78
Lassen.....	720		25	25		50	6.94
Los Angeles.....	1,500	85	1,000			1,085	72.33
Madera.....	410				30	30	7.31
Marin.....	309						
Mariposa.....	355						
Mendocino.....	1,200						
Merced.....	450	1	136			137	30.44
Modoc.....	766		10			10	1.30
Mono.....	380						
Monterey.....	600	50	50			100	16.66
Napa.....	560	3	450			453	80.89
Nevada.....	600	30				30	5.00
Orange.....	500		25	5		30	6.00
Placer.....	775	7				7	.90
Plumas.....	385		10			10	2.59
Riverside.....	800	4	48	2		54	6.75
Sacramento.....	1,500	86	20			106	7.06
San Benito.....	451		160	150		310	68.73
San Bernardino.....	3,840						
San Diego.....	5,200			450		450	8.65
San Francisco.....	(4)						
San Joaquin.....	990	12	25			37	3.73
San Luis Obispo.....	1,100		162		1	163	14.82
San Mateo.....	350	131	65	15	17	228	65.14
Santa Barbara.....	750	16	45		5	66	8.80
Santa Clara.....	1,200	20	600	200	6	826	68.83
Santa Cruz.....	420	12.25	25	6	7	50.25	11.96
Shasta.....	1,575		66	170		236	14.98
Sierra.....	525						
Siskiyou.....	2,625	.5	20	4		24.5	.93
Solano.....	630	9	25	1		35	5.55
Sonoma.....	1,260	35	600	120		755	59.92
Stanislaus.....	470		55			55	11.70
Sutter.....	350	8	50			58	16.57
Tehama.....	650	5	60	1		66	10.15
Trinity.....	200		5			5	2.50
Tulare.....	2,285				60	60	2.62
Tuolumne.....	290		52		15	67	23.10
Ventura.....	700				100	100	14.28
Yolo.....	680	2.5	360		30	392.5	57.72
Yuba.....	1,000		15			15	1.50
Total.....	48,069	579.25	6,054	1,289	653	18,587.75	17.87

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Oiled.	Total.	
1904.....	46,653	418.5	5,843.5		2,541	8,803	18.87
1909.....	48,069	579.25	6,054	1,289	653	18,587.75	17.87
Gain.....	1,416	160.75	210.5	1,289			

¹ Includes 12.5 miles of wood puncheon road.² Bituminous-macadam.³ This is exclusive of roads in the Mojave Desert, which comprises about 85 per cent of the county.⁴ Included in the city of San Francisco. No country roads in this county.

TABLE 12.—*Cost data, 1909.*

County.	Average cost per mile.			
	Sand-clay.	Gravel.	Macadam.	Bituminous.
	Dollars.	Dollars.	Dollars.	Dollars.
Alameda.....		1 1.35	1 1.35	
Del Norte.....		2,500.00		
Glenn.....		2 .89		
Humboldt.....		1.60	1.95	(¹)
Los Angeles.....				11,000.00
Merced.....			9,000.00	
Nevada.....		1,400.00		
Riverside.....		1.14		1.76
Sacramento.....				7,500.00
San Diego.....	625.00			1 1.62
San Mateo.....			1.59	1 1.73
Santa Barbara.....				7,800.00
Santa Clara.....	200.00	1,000.00	6,000.00	8,000.00
Santa Cruz.....			5,200.00	
Shasta.....		1,500.00		
Siskiyou.....		1,000.00		
Sonoma.....		1 1.25	1 1.87	
Tehama.....		850.00	1,300.00	
Yolo.....		1.10	1.63	
Average.....	412.00	1,375.00	5,375.00	8,575.00

¹ Average cost per square yard: Gravel, \$0.69; macadam, \$1.08; bituminous, \$1.37.

² Cost per cubic yard.

COLORADO.

TABLE 13.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Macadam.	Gravel.	Total.	
Adams.....	673		52	52	7.72
Arapahoe.....	378		16	16	4.23
Archuleta.....	400				
Baca.....	2				
Bent.....	447		6	6	1.34
Boulder.....	613		40	40	6.52
Chaffee.....	307				
Cheyenne.....	200				
Clear Creek.....	110				
Conejos.....	822				
Costilla.....	350		8	8	2.28
Custer.....	800				
Delta.....	500				
Denver.....	(²) 70				
Dolores.....	576				
Douglas.....	175				
Eagle.....	661		30	30	4.53
El Paso.....	586			2	.52
Fremont.....	382	2		2	.35
Garfield.....	570		2		
Gilpin.....	160				
Grand.....	212				
Gunnison.....	700				
Hinsdale.....	142				
Huerfano.....	500				
Jackson.....	1,000				
Jefferson.....	568	10	5	15	2.64
Kiowa.....	233				
Kit Carson.....	23				
La Plata.....	550				
Lake.....	88		4	4	4.54
Larimer.....	719				
Las Animas.....	958				
Lincoln.....	264				
Logan.....	1,042		6.5	6.5	.62
Mesa.....	933				
Mineral.....	134				
Montezuma.....	300				

¹ Moffat County established in March, 1911, from part of Routt Co.

² The county of Denver has no rural roads; the entire county is included in the city of Denver.

TABLE 13.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Macadam.	Gravel.	Total.	
Montrose.....	996				
Morgan.....	696				
Otero.....	759		20	20	2.63
Ourray.....	480				
Park.....	165				
Phillips.....	319				
Pitkin.....	275				
Prowers.....	375		5	5	1.33
Pueblo.....	1,400	2	10	12	.85
Rio Blanco.....	448				
Rio Grande.....	474		38	38	8.01
Routt.....	900				
Saguache.....	958				
San Juan.....	100				
San Miguel.....	300				
Sedgwick.....	216		4	4	1.85
Summit.....	214				
Teller.....	214				
Washington.....	714				
Weld.....	2,000		60	60	3.00
Yuma.....	542				
Total.....	29,693	14	306.5	320.5	1.08

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Macadam.	Gravel.	Total.	
1904.....	30,214	57	121	178	0.59
1909.....	29,693	14	306.5	320.5	1.08
Gain.....			185.5	142.5	.49

TABLE 14.—Cost data, 1909.

County.	Average cost per mile.		County.	Average cost per mile.	
	Earth.	Gravel.		Earth.	Gravel.
	Dollars.	Dollars.		Dollars.	Dollars.
Adams.....		2,000	Pueblo.....		2,000
Bent.....		700	Summit.....		
Boulder.....		1,200	Average.....	600	1,475
Logan.....	800				
Montrose.....	400				

CONNECTICUT.

TABLE 15.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Graded earth.	Total.	
Fairfield.....	2,195	80	224.79	197	103.63	605.42	27.58
Hartford.....	1,783	235.88	189.56	319.25	51.7	796.39	44.66
Litchfield.....	2,211	31.48	71.31	169	72.46	344.25	15.57
Middlesex.....	794	73.91	27.1	140	55.29	296.3	37.32
New Haven.....	1,999	117.24	104.64	120	27	368.88	18.45
New London.....	1,418	85.02	64.6	31	26.06	206.68	14.60
Tolland.....	1,002	14.11	43.39	20	21.65	99.15	9.89
Windham.....	1,181	27.98	49.01	218	18.48	313.47	26.54
Total.....	12,583	665.62	774.4	1,214.25	376.27	3,030.54	24.08

TABLE 15.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Graded earth.	Total.	
1904.....	14,088	463.5	1,896.5	.....	.....	2,360.1	16.75
1909.....	12,583	665.62	774.4	1,214.25	376.27	3,030.54	24.68
Gain.....	.....	202.12	.....	1,214.25	376.27	670.44	7.33

TABLE 16.—*Cost data, 1909.*

County and town-ship.	Average cost per mile.			County and town-ship.	Average cost per mile.		
	Gravel.	Macadam.	Telford.		Gravel.	Macadam.	Telford.
	Dollars.	Dollars.	Dollars.		Dollars.	Dollars.	Dollars.
Fairfield County:				Middlesex County:			
Bridgeport.....		6,811.00		Chester.....		7,075.00	10,507.00
Brookfield.....	3,960.00		18,712.00	Cromwell.....	6,019.00		17,339.00
Danbury.....		9,845.00	11,721.00	Durham.....			6,019.00
Do.....			13,200.00	East Haddam.....		12,883.00	
Fairfield.....		8,131.00	11,563.00	Middlefield.....		7,656.00	10,032.00
New Canaan.....		10,296.00		New Haven County:			
Do.....		10,560.00		Bethany.....	5,174.00		
Norwalk.....	4,488.00		15,280.00	Branford.....		7,233.00	9,345.00
Ridgefield.....	5,280.00			Derby.....		9,556.00	
Stamford.....		10,348.00	12,724.00	Guilford.....			9,345.00
Do.....		8,870.00		Do.....			16,356.00
Stratford.....		7,339.00		Hamden.....		6,600.00	
Trumbull.....		8,976.00	11,880.00	Madison.....	4,171.00		
Do.....		7,687.00		Meriden.....		6,336.00	8,817.00
Westport.....	6,283.00			Naugatuck.....		9,240.00	11,880.00
Hartford County:				New Haven.....		5,966.00	
Avon.....		6,230.00	8,448.00	North Branford.....			9,609.00
Berlin.....		6,336.00	8,131.00	North Haven.....		6,547.00	
Bristol.....		6,600.00	9,240.00	Woodbridge.....		8,712.00	
East Granby.....	5,544.00		18,712.00	New London County:			
Enfield.....		9,345.00	15,048.00	Chester.....	7,867.00		10,507.00
Granby.....		7,603.00	9,979.00	East Lyme.....		8,817.00	
Hartford.....			15,048.00	Franklin.....	4,382.00		17,022.00
Newington.....		7,339.00	9,662.00	Lebanon.....			13,960.00
Plainville.....			10,296.00	Lisbon.....	5,649.00	6,758.00	
Rocky Hill.....		8,712.00	12,712.00	Montville.....		11,563.00	15,259.00
Simsbury.....		11,035.00	17,424.00	New London.....		10,137.00	13,992.00
Southington.....		7,339.00	8,184.00	N. Stonington.....	5,121.00		
South Windsor.....		7,761.00	13,728.00	Norwich.....		9,820.00	
Suffield.....		6,388.00		Old Lyme.....	3,168.00	8,289.00	
Do.....		8,606.00		Preston.....	8,395.00		
Do.....		5,544.00		Sprague.....		9,768.00	12,936.00
Wethersfield.....		8,712.00	11,880.00	Stonington.....	4,171.00		
Do.....		7,392.00		Waterford.....		6,547.00	9,715.00
Windsor.....		7,286.00	11,352.00	Windham County:			
Windsor Locks.....		10,450.00	15,048.00	Killingly.....	3,537.00		
Litchfield County:				Do.....	5,649.00		
Canaan.....	8,078.00		19,504.00	Plainfield.....	5,280.00		
Litchfield.....	7,392.00		9,556.00	Putnam.....		4,646.00	17,128.00
Norfolk.....			17,920.00	Windham.....	4,699.00		
North Canaan.....		6,072.00	10,718.00	Woodstock.....			10,560.00
Roxbury.....		7,550.00	10,718.00	Do.....			16,336.00
Sharon.....	4,752.00		17,920.00				
Washington.....		11,668.00		Average.....	5,411.77	8,219.60	10,254.87

¹ Surfaced with gravel.

DELAWARE.

TABLE 17.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Shell.	Total.	
Kent.....	900					
New Castle.....	1,000	¹ 94.36	3	5	² 102.44	10.24
Sussex.....	1,100	2	46	30	³ 84	7.63
Total.....	3,000	¹ 96.36	49	35	⁴ 186.44	6.22

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Shell.	Total.	
1904.....	3,000	14	2	50	66	2.20
1909.....	3,000	¹ 96.36	49	35	⁴ 186.44	6.22
Gain.....		82.36	47		120.44	4.02

¹ Includes 0.36 mile of bituminous-macadam road.² Includes 0.075 mile of sand-clay road.³ Includes 6 miles of sand-clay roads.⁴ Includes 6.075 miles of sand-clay roads.

TABLE 18.—Cost data, 1909.

County.	Average cost per mile.					
	Macadam.			Bituminous. ¹	Sand-clay.	Gravel.
	Limestone. ¹	Granite. ²	Trap rock. ¹			
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Kent ⁴						
New Castle.....	6,150.00	6,900.00	7,500.00	10,120.00		
Sussex.....					³ 0.15	³ 0.25
Average.....		6,850.00				

¹ Average width of roads, 12 feet; average depth, 6 inches.² Average width of roads, 13 feet; average depth, 7 inches.³ Per square yard.⁴ No report submitted.

FLORIDA.

TABLE 19.—Mileage of public roads, 1909.

County. ¹	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Shell.	Total.	
Alachua.....	900						
Baker.....	500						
Bradford.....	500						
Brevard.....	450						
Calhoun.....	250			30		30	6.67
Citrus.....	125		35	35		70	56.00
Clay.....	200						
Columbia.....	200						
Dade.....	300		180			180	60.00
De Soto.....	650		10	20		30	4.61
Duval.....	750	15.25	6.6		32	53.85	7.18
Escambia.....	200		10	110		120	46.15
Franklin.....	(²)						
Gadsden.....	225			14		14	6.22
Hamilton.....	150			2		2	1.33
Hernando.....	165						
Hillsboro.....	2,000	91			25	116	5.80
Holmes.....	1,000						
Jackson.....	400						
Jefferson.....	350						
Lafayette.....	350						
Lake.....	121			78.5		78.5	64.87
Lee.....	250	8			12	20	8.00
Leon.....	450			150		150	33.33
Levy.....	450				4	4	.88
Liberty.....	150						
Madison.....	238						
Manatee.....	500						
Marion.....	500	100		200		300	60.00
Monroe.....	(³)						
Nassau.....	260						
Orange.....	350	15		100		115	32.85
Osceola.....	275	25				25	9.09
Pasco.....	250			10		10	4.00
Polk.....	1,000	20		150		170	17.00
Putnam.....	300		18		5	23	7.66
St. John.....	200			1	15	16	8.00
St. Lucie.....	200			20	25	45	22.50
Santa Rosa.....	255			20		20	7.84
Sumter.....	250			40		40	16.00
Suwanee.....	300	4		7		11	3.66
Taylor.....	250						
Volusia.....	125			10	80	90	72.00
Wakulla.....	280						
Walton.....	400			3		3	.75
Washington.....	500			16		16	3.20
Total.....	17,579	278.25	259.6	1,016.50	198	1,752.35	9.97

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.					Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Shell.	Total.	
1904.....	17,374	345	17.5	435	88	885.5	5.10
1909.....	17,579	278.25	259.6	1,016.50	198	1,752.35	9.97
Gain.....	205		242.1	581.50	110	866.85	4.87

¹ Palm Beach County established from Dade County in 1909, after this investigation was completed.² Reports indicate that there are practically no roads in this county and that transportation is mostly by water.³ The county of Monroe has no rural roads; the entire county is included in city of Key West.

TABLE 20.—*Cost data, 1909.*

County.	Average cost per mile.				
	Earth.	Sand-clay.	Gravel.	Shell.	Marl.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Citrus.....		800			1,000
Dade.....					1,467
De Soto.....		1,000			
Duval.....			6,500	6,500	8,000
Hillsboro.....					5,000
Lake.....	500				
Lee.....				800	
Leon.....	300				
Marion.....	1,000				1,500
Monroe.....			3,500		
Nassau.....				4,000	
Orange.....		550			2,175
Osceola.....	1,000				1,750
Polk.....	1,000				
Putnam.....	1,200		1,700	2,500	
St. John.....				4,000	
St. Lucie.....		900		2,000	
Santa Rosa.....		1,000			
Sumter.....		725			
Suwanee.....	500				4,000
Volusia.....				2,500	
Average.....	786	829	3,900	3,186	3,112

GEORGIA.

TABLE 21.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Stone.	Total.	
Appling.....	600		51		15	2.50
Baker.....	275		35		35	12.72
Baldwin.....	335		50		50	14.92
Banks.....	300		14		14	4.66
Bartow.....	1,000					
Ben Hill.....	250		50		50	20.00
Berrien.....	1,200		100		100	8.33
Bibb.....	500		100		100	20.00
Brooks.....	450					
Bryan.....	600		20		20	3.33
Bulloch.....	900		50		50	5.55
Burke.....	700		150		150	21.42
Butts.....	300					
Calhoun.....	210					
Camden.....	275			10	120	7.27
Campbell.....	465					
Carroll.....	800			18	18	2.25
Catoosa.....	200	30			30	15.00
Charlton.....	200					
Chatham.....	220	100		1	108	49.09
Chattahoochee.....	262					
Chattooga.....	350	25			25	7.14
Cherokee.....	1,000	3	10		13	1.30
Clarke.....	147		50	5	55	37.41
Clay.....	360		40		40	11.11
Clayton.....	300					
Clinch.....	400			10	10	2.50
Cobb.....	800		6	15	21	2.62
Coffee.....	950		50		50	5.26
Colquitt.....	700					
Columbia.....	350	20			20	5.71
Coweta.....	800		240		240	30.00
Crawford.....	300					
Crisp.....	450		250		250	55.55
Dade.....	145	25			25	17.24

¹ Includes 10 miles of shell roads.² Includes 7 miles of shell roads.

TABLE 21.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Stone.	Total.	
Dawson.....	300					
Decatur.....	1,000		100		100	10.00
Dekalb.....	1,300	15		13	28	2.15
Dodge.....	450		25		25	5.55
Dooley.....	700		150		150	21.42
Dougherty.....	350		208	8	216	61.71
Douglas.....	400					
Early.....	1,000		100		100	10.00
Echols.....	175					
Effingham.....	500					
Elbert.....	700					
Emanuel.....	1,000		25		25	2.50
Fannin.....	200					
Fayette.....	300					
Floyd.....	800	80		65	145	18.12
Forsyth.....	600					
Franklin.....	500					
Fulton.....	400			300	305	76.25
Gilmer.....	1,000					
Glascocock.....	200		35		35	17.50
Glynn.....	299		130		153	76.50
Gordon.....	400					
Grady.....	400					
Greene.....	850	4	2	5	11	1.29
Gwinnett.....	1,000					
Habersham.....	400			1	1	.25
Hall.....	600			8	8	1.33
Hancock.....	750	5	10		15	2.00
Haralson.....	500					
Harris.....	500					
Hart.....	500					
Heard.....	310		8		8	2.58
Henry.....	900					
Houston.....	1,400		50		50	3.57
Irwin.....	175		80		80	45.71
Jackson.....	1,000					
Jasper.....	450					
Jeff Davis.....	500					
Jefferson.....	563		50		50	8.88
Jenkins.....	190		30		30	15.78
Johnson.....	200		35		35	17.50
Jones.....	600		200		200	33.33
Laurens.....	1,310		65		65	4.96
Lee.....	800		75		75	9.37
Liberty.....	500		2		2	.40
Lincoln.....	900					
Lowndes.....	1,250		50		50	4.00
Lumpkin.....	400					
McDuffie.....	400		100		100	25.00
McIntosh.....	150		5		5	3.00
Macon.....	550	5	32		37	5.90
Madison.....	950				200	21.05
Marion.....	300		50		50	16.66
Meriwether.....	1,400					
Miller.....	260					
Milton.....	250					
Mitchell.....	600		55		55	9.16
Monroe.....	1,000					
Montgomery.....	800					
Morgan.....	1,000	100	25		125	12.50
Murray.....	250	10			10	4.00
Muscogee.....	400	53	50	28	131	32.75
Newton.....	250	50	5		55	22.00
Oconee.....	350					
Oglethorpe.....	940		75		75	7.97
Paulding.....	700					
Pickens.....	500					
Pierce.....	250		2		2	.80
Pike.....	900		20		20	2.22
Polk.....	600	55	5	5	65	10.83
Pulaski.....	580		100		100	17.24
Putnam.....	350	15			15	4.28
Quitman.....	250					
Rabun.....	400					
Randolph.....	650		106		106	16.30
Richmond.....	900	56	110		166	18.44

¹ Includes 5 miles of bituminous-macadam roads.² Includes 23 miles of shell roads.³ Includes 4 miles of shell roads.⁴ Shell roads.

TABLE 21.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Stone.	Total.	
Rockdale.....	238		7.5		7.5	3.15
Schley.....	280		3		3	1.07
Screven.....	625		50		50	8.00
Spalding.....	1,000		30.5		30.5	3.05
Stephens.....	340		14		14	4.11
Stewart.....	690		35		35	5.07
Sumter.....	1,150		70		70	6.08
Talbot.....	414					
Taliaferro.....	400					
Tattnall.....	950		55		55	5.78
Taylor.....	350		5		5	1.42
Telfair.....	400		50		50	12.50
Terrell.....	800		125		125	15.62
Thomas.....	600		50		50	8.33
Tift.....	350		89		89	25.43
Toombs.....	380					
Towns.....	150					
Troup.....	650		25		25	3.84
Turner.....	800		100		100	12.50
Twiggs.....	300					
Union.....	200					
Upson.....	400					
Walker.....	563	234			234	41.56
Walton.....	1,400					
Ware.....	300		4		4	1.33
Warren.....	325					
Washington.....	1,200		200		200	16.66
Wayne.....	600		8		8	1.33
Webster.....	228		5		5	2.19
White.....	250					
Whitfield.....	450			5	5	1.11
Wilcox.....	800		5		5	.62
Wilkes.....	900			25	25	2.77
Wilkinson.....	500					
Worth.....	800					
Total.....	82,230	880.5	4,326.5	522	1 5,978	7.27

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Stone.	Total.	
1904.....	57,203	659	513	438	² 1,634	2.86
1909.....	82,230	880.5	4,326.5	522	¹ 5,978	7.27
Gain.....	25,027	221.5	3,813.5	84	4,344	4.41

¹ Includes 244 miles of shell roads and 5 miles of bituminous-macadam roads.² Includes 24 miles of shell road.

TABLE 22.—Cost data, 1909.

County.	Average cost per mile.			
	Earth.	Sand-clay.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.	Dollars.
Appling.....	200.00			
Baker.....		300.00		
Banks.....		250.00		
Ben Hill.....		150.00		
Bibb.....		800.00		
Bryan.....		100.00		
Bulloch.....		450.00		
Camden.....		300.00		
Campbell.....	1,000.00			
Carroll.....				2,000.00
Chatham.....			¹ 3,500.00	
Chattooga.....			700.00	
Cobb.....				4,000.00
Coffee.....		300.00		
Coweta.....		400.00		
Decatur.....		150.00		
Dekalb.....			1,250.00	5,000.00
Dodge.....	400.00			
Dooly.....		130.00		
Dougherty.....		350.00		1,000.00
Early.....		100.00		
Emanuel.....	800.00			
Floyd.....			1,500.00	1,500.00
Franklin.....	1,500.00			
Fulton.....				² .33
Glascok.....		250.00		
Greene.....		200.00	200.00	
Hall.....				1,500.00
Hancock.....		500.00		
Heard.....		800.00		
Irwin.....		125.00		
Jefferson.....		250.00		
Jenkins.....		400.00		
Johnson.....		200.00		
Laurens.....	700.00			
Lee.....		400.00		
Macon.....		500.00		
Marion.....		175.00		
Mitchell.....		225.00		
Muscogee.....				2,000.00
Newton.....			300.00	
Pike.....	250.00			
Polk.....		500.00	800.00	1,200.00
Pulaski.....		250.00		
Rockdale.....		1,200.00		
Spalding.....		250.00		
Stephens.....		350.00		
Sumter.....		1,000.00		
Taylor.....		500.00		
Telfair.....	750.00			
Terrell.....		350.00		
Thomas.....		450.00		
Tift.....		200.00		
Troup.....		600.00		
Turner.....		900.00		
Walker.....			1,500.00	
Ware.....		350.00		
Whitfield.....			1,500.00	
Average.....	700.00	387.00	1,250.00	2,275.00

¹ Material shipped by rail from near Augusta.² Per square yard.

IDAHO.

TABLE 23.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Ada.....	400	2	5		7	1.75
Bannock.....	492					
Bear Lake.....	105		35		35	33.33
Bingham.....	1,000					
Blaine.....	300					
Boise.....	1,000					
Bonner.....	250					
Canyon.....	500		10	20	30	6.00
Cassia.....	650					
Custer.....	340					
Elmore.....	280					
Fremont.....	3,800					
Idaho.....	1,500	10	1.5		11.5	.76
Kootenai.....	250			150	150	60.00
Latah.....	1,056	5	10		15	1.42
Lemhi.....	400					
Lincoln.....	600					
Nez Perce.....	2,200		2		2	.09
Oneida.....	800		10		10	1.25
Owyhee.....	450			20	20	4.44
Shoshone.....	400		22	208	230	57.50
Twin Falls.....	650					
Washington.....	1,000					
Total.....	18,403	17	95.5	398	510.5	2.77

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	18,163	17	195		212	1.16
1909.....	18,403	17	95.5	398	510.5	2.77
Gain.....	240			398	298.5	1.61

¹ Adams County established in February, 1911, from part of Washington County; Bonneville County established in February, 1911, from part of Bingham County; Clearwater County established in February, 1911, from part of Nez Perce County; and Lewis County established in February, 1911, from part of Nez Perce County.

ILLINOIS.

TABLE 24.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Total mileage of all improved roads. ¹	Approximate percentage of roads improved.	County.	Total mileage of all public roads.	Total mileage of all improved roads. ¹	Approximate percentage of roads improved.
Adams.....	1,543	177	11.47	Livingston.....	1,734	77	4.44
Alexander.....	427	20	4.68	Logan.....	1,014	6	.59
Bond.....	674	7	1.03	McDonough.....	1,196	2	.16
Boone.....	510	249	48.82	McHenry.....	1,134	780	68.78
Brown.....	462	1	.21	McLean.....	2,069	116	5.60
Bureau.....	1,583	401	31.01	Macon.....	1,025	68	6.63
Calhoun.....	288	2	.69	Macoupin.....	1,369	.....	.....
Carroll.....	807	46	5.70	Madison.....	1,509	46	3.04
Cass.....	523	.....	.....	Marion.....	1,145	2	.17
Champaign.....	1,830	5	.27	Marshall.....	634	50	7.88
Christian.....	1,351	17	1.25	Mason.....	771	.....	.....
Clark.....	1,063	48	4.51	Massac.....	403	49	12.15
Clay.....	922	.....	.....	Menard.....	411	.....	.....
Clinton.....	704	.....	.....	Mercer.....	904	.....	.....
Coles.....	897	26	2.90	Monroe.....	703	21	2.98
Cook.....	1,450	818	56.41	Montgomery.....	1,220	5	.41
Crawford.....	715	25	3.49	Morgan.....	832	.....	.....
Cumberland.....	687	5	.72	Moultrie.....	551	.....	.....
Dekalb.....	1,096	415	37.86	Ogle.....	1,222	195	15.95
Dewitt.....	737	.....	.....	Peoria.....	983	226	22.99
Douglas.....	709	.....	.....	Perry.....	668	.....	.....
Dupage.....	629	430	68.36	Piatt.....	621	.....	.....
Edgar.....	1,187	235	19.79	Pike.....	1,347	51	3.78
Edwards.....	460	.....	.....	Pope.....	465	7	1.50
Effingham.....	930	5	.53	Pulaski.....	346	4	1.15
Fayette.....	1,163	4	.34	Putnam.....	287	37	12.89
Ford.....	785	95	12.10	Randolph.....	974	25	2.56
Franklin.....	740	6	.81	Richland.....	770	1	.12
Fulton.....	1,698	1	.05	Rock Island.....	784	33	4.20
Gallatin.....	491	2	.40	St. Clair.....	1,139	29	2.54
Greene.....	805	.....	.....	Saline.....	354	2	.56
Grundy.....	748	98	13.10	Sangamon.....	1,220	3	.24
Hamilton.....	1,744	.....	.....	Schuyler.....	736	4	.54
Hancock.....	1,178	24	2.03	Scott.....	440	.....	.....
Hardin.....	245	.....	.....	Shelby.....	1,575	1	.06
Henderson.....	607	.....	.....	Stark.....	443	2	.45
Henry.....	1,430	8	.55	Stephenson.....	959	103	10.74
Iroquois.....	1,919	80	4.16	Tazewell.....	998	53	5.31
Jackson.....	871	8	.91	Union.....	626	25	3.99
Jasper.....	844	.....	.....	Vermilion.....	1,598	207	12.95
Jefferson.....	1,174	.....	.....	Wabash.....	401	.....	.....
Jersey.....	598	5	.83	Warren.....	1,045	10	.95
Jo Daviess.....	1,034	52	5.02	Washington.....	772	2	.25
Johnson.....	605	.....	.....	Wayne.....	1,263	.....	.....
Kane.....	971	800	82.38	White.....	600	8	1.33
Kankakee.....	1,127	157	13.93	Whiteside.....	1,120	200	17.85
Kendall.....	530	271	51.13	Will.....	1,534	410	26.72
Knox.....	743	3	.40	Williamson.....	587	.....	.....
Lake.....	835	311	37.24	Winnebago.....	931	403	43.28
La Salle.....	1,919	513	26.73	Woodford.....	896	12	1.33
Lawrence.....	636	27	4.24	Total.....	94,141	8,914	9.47
Lee.....	1,189	152	12.78				

RECAPITULATION.

Year.	Total mileage of all public roads.	Total mileage of all improved roads. ¹	Approximate percentage of roads improved.
1904.....	94,141	² 7,924	8.42
1909.....	94,141	8,914	9.47
Gain.....		1,008	1.05

¹ Stone and gravel roads.² Includes 4½ miles of brick roads, 6 miles of slag roads, 1 mile of road surfaced with cinder, 6 miles of road surfaced with burnt shale, 6,890 miles of gravel roads, and 1,106.5 miles of stone roads.

INDIANA.

TABLE 25.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Adams.....	675	152.5	102.5	255	37.77
Allen.....	900	37	654.5	691.5	76.83
Bartholomew.....	900	43.5	321.5	365	40.55
Benton.....	775	48	207.5	255.5	32.96
Blackford.....	360	8	92	100	27.77
Boone.....	816	.....	735.5	735.5	90.13
Brown.....	350	.....	10	10	2.85
Carroll.....	847	15	300	315	37.19
Cass.....	988	27.5	350	377.5	38.20
Clark.....	600	84	12	96	16.00
Clay.....	800	62.75	250	312.75	39.09
Clinton.....	700	.....	500	500	71.42
Crawford.....	229	26	.....	26	11.35
Daviess.....	860	37	127	164	19.06
Dearborn.....	255	88.5	40	130.25	51.07
Decatur.....	600	170	14	184	30.66
Dekalb.....	360	.....	279	279	77.50
Delaware.....	800	25.5	600	625.5	78.18
Dubois.....	700	48.5	.....	48.5	6.92
Elkhart.....	580	.....	295	295	50.86
Fayette.....	386	75	270	270.75	70.14
Floyd.....	350	26	93	119	34.00
Fountain.....	1,200	42	332	374	31.16
Franklin.....	1,000	32	85	117	11.70
Fulton.....	682	.....	93.5	93.5	13.70
Gibson.....	1,350	84	41	125	9.25
Grant.....	900	21.5	434	455.5	50.61
Greene.....	900	104.75	177	281.75	31.30
Hamilton.....	700	3	397	400	57.14
Hancock.....	605	1	425	426	70.41
Harrison.....	675	58.5	11	69.5	10.23
Hendricks.....	820	18	335.5	353.5	43.10
Henry.....	790	1	558	559	70.75
Howard.....	600	15	272	287	47.83
Huntington.....	856	11	451	462	53.97
Jackson.....	650	19.5	500	519.5	79.92
Jasper.....	600	110.25	103	213.25	35.54
Jay.....	800	39	342	381	47.62
Jefferson.....	790	84.5	114	198.5	25.12
Jennings.....	621	187	57	244	39.29
Johnson.....	620	.....	155	155	25.00
Knox.....	760	90	304.5	394.5	51.91
Kosciusko.....	1,300	3.75	351	354.75	27.28
La Grange.....	826	.....	130	130	15.73
Lake.....	700	50.5	2 65	115.5	16.50
Laporte.....	1,200	63	47.5	110.5	9.20
Lawrence.....	600	175.5	152	327.5	54.58
Madison.....	900	13	409	422	46.88
Marion.....	800	25	500	525	65.62
Marshall.....	800	.....	165.5	165.5	20.68
Martin.....	400	30	6	36	9.00
Miami.....	750	.....	308	320	42.66
Monroe.....	865	206.25	4.75	211	24.39
Montgomery.....	827	17.75	600	617.75	74.69
Morgan.....	500	70.5	180	250.5	50.10
Newton.....	632	121.5	33.5	155	24.52
Noble.....	850	.....	220	220	25.88
Ohio.....	160	26	4	4 65	40.62
Orange.....	700	145	96.5	241.5	34.50
Owen.....	692	175	395	570	82.36
Parke.....	1,200	20	558	578	48.16
Perry.....	800	.....	.....	.....	.....
Pike.....	1,200	36	.....	36	3.00
Porter.....	1,000	64.25	100	164.25	16.42
Posey.....	500	75	73.25	148.25	29.65
Pulaski.....	875	18.25	74.5	92.75	10.60
Putnam.....	900	300	268	568	63.11
Randolph.....	900	79.5	427	506.5	56.27
Ripley.....	462	127	15	142	30.73
Rush.....	1,100	24	275	299	27.18
St. Joseph.....	871	.....	116	116	13.31

1 Includes 1.75 miles of bituminous-macadam roads.

2 Includes 1.75 miles of slag roads.

3 Includes 12 miles of bituminous-macadam roads.

4 Includes 35 miles of bituminous-macadam roads.

TABLE 25.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Scott.....	400	10	40.5	50.5	12.62
Shelby.....	630	17.5	259.5	277	46.16
Spencer.....	1,008	30	.....	30	2.97
Starke.....	650	13	110	123	18.92
Steuben.....	700	.....	40	40	5.71
Sullivan.....	974	59	324	383	39.32
Switzerland.....	345	92	30	122	35.36
Tippecanoe.....	825	1	421.25	422.25	51.18
Tipton.....	560	22	400	422	75.35
Union.....	280	35	75	110	39.28
Vanderburg.....	600	92	60	152	25.33
Vermilion.....	800	.....	257.5	257.5	32.18
Vigo.....	725	19	300	319	44.00
Wabash.....	600	28	300	328	54.66
Warren.....	610	.5	302.5	303	49.67
Warrick.....	750	30	.....	30	4.00
Washington.....	1,500	119	23	142	9.46
Wayne.....	828	.....	620	620	74.87
Wells.....	780	51	500	551	70.64
White.....	750	90	180	270	36.00
Whitley.....	651	.....	250	250	38.40
Total.....	67,996	4,398.25	20,508.75	24,955.75	36.70

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	68,306	3,295	20,582	23,877	34.96
1909.....	67,996	4,398.25	20,508.75	24,955.75	36.70
Gain.....	.....	1,103.25	.....	1,078.75	1.74

¹ Includes 48.75 miles of bituminous-macadam roads.

TABLE 26.—Cost data, 1909.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Adams County:	<i>Dollars.</i>	<i>Dollars.</i>	Benton County:	<i>Dollars.</i>	<i>Dollars.</i>
Blue Creek.....	.....	3,000	Grant.....	2,200	.....
Jefferson.....	200	3,100	Hickory Grove.....	2,500	3,000
Root.....	500	1,100	Richland.....	2,000	3,000
St. Marys.....	.....	3,500	Union.....	2,300	2,800
Union.....	.....	3,000	York.....	2,000	.....
Washington.....	2,000	3,000	Blackford County:	.....	.....
Allen County:	.....	.....	Jackson.....	2,500	4,000
Aboite.....	1,250	.....	Boone County:	.....	.....
Maumee.....	800	3,200	Center.....	1,350	.....
Milan.....	750	.....	Clinton.....	1,900	.....
Monroe.....	1,200	3,500	Eagle.....	2,600	.....
Scipio.....	600	.....	Harrison.....	2,000	.....
Washington.....	600	1,000	Jefferson.....	1,250	.....
Wayne.....	900	1,200	Marion.....	2,000	.....
Bartholomew County:	.....	.....	Union.....	1,800	.....
Harrison.....	1,200	.....	Carroll County:	.....	.....
Jackson.....	1,000	.....	Burlington.....	1,750	.....
Nineveh.....	3,600	.....	Jackson.....	1,600	4,000
Rock Creek.....	3,000	5,000	Madison.....	1,500	.....
Sand Creek.....	2,000	8,100	Monroe.....	1,900	.....
Wayne.....	1,500	.....	.....	.....	.....

TABLE 26.—*Cost data, 1909—Continued.*

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Cass County:	<i>Dollars.</i>	<i>Dollars</i>	Grant County:	<i>Dollars.</i>	<i>Dollars.</i>
Clay.....	2,800	5,000	Green.....	2,500	3,000
Deer Creek.....	1,800	.....	Monroe.....	4,000	.....
Miami.....	1,800	.....	Sims.....	2,000	.....
Noble.....	1,000	1,400	Greene County:	.....	.....
Tipton.....	2,500	5,000	Center.....	.....	1,350
Clark County:	.....	.....	Highland.....	2,000	.....
Bethlehem.....	900	1,600	Hamilton County:	.....	.....
Union.....	1,200	1,300	Delaware.....	1,800	8,000
Utica.....	500	5,800	Jackson.....	3,168	5,600
Clay County:	.....	.....	Harrison County:	.....	.....
Harrison.....	3,000	3,000	Blue River.....	.....	1,650
Perry.....	.....	3,200	Harrison.....	.....	1,800
Sugar Ridge.....	3,500	5,700	Jackson.....	.....	1,800
Washington.....	3,300	.....	Morgan.....	.....	1,870
Clinton County:	.....	.....	Spencer.....	.....	1,600
Center.....	1,000	.....	Washington.....	.....	1,500
Jackson.....	2,300	.....	Hendricks County:	.....	.....
Kirklin.....	2,000	.....	Center.....	2,000	3,000
Ross.....	1,400	.....	Liberty.....	2,500	.....
Sugar Creek.....	1,800	.....	Washington.....	.....	5,000
Crawford County:	.....	.....	Henry County:	.....	.....
Liberty.....	.....	1,400	Franklin.....	1,000	.....
Sterling.....	.....	1,800	Henry.....	960	.....
Whiskey Run.....	.....	1,600	Jefferson.....	600	900
Daviess County:	.....	.....	Spiceland.....	750	.....
Barr.....	3,500	2,300	Howard County:	.....	.....
Bogard.....	3,300	.....	Center.....	2,000	2,000
Elmore.....	2,000	2,100	Howard.....	2,500	.....
Harrison.....	4,100	.....	Jackson.....	2,600	3,500
Washington.....	2,700	2,700	Huntington County:	.....	.....
Dearborn County:	.....	.....	Dallas.....	1,100	.....
Center.....	.....	3,640	Huntington.....	1,100	1,200
Clay.....	.....	3,000	Salomonie.....	1,600	.....
Decatur County:	.....	.....	Jackson County:	.....	.....
Salt Creek.....	.....	1,950	Brownstown.....	1,500	.....
Dekalb County:	.....	.....	Driftwood.....	1,500	.....
Jackson.....	600	.....	Grassy Fork.....	2,000	.....
Spencer.....	800	.....	Hamilton.....	1,000	.....
Union.....	2,200	.....	Washington.....	2,500	2,640
Delaware County:	.....	.....	Jasper County:	.....	.....
Liberty.....	1,800	2,000	Barkley.....	1,750	.....
Mount Pleasant.....	900	.....	Kankakee.....	2,500	2,500
Salem.....	1,500	.....	Marion.....	2,500	2,500
Washington.....	4,500	3,000	Jay County:	.....	.....
Dubois County:	.....	.....	Noble.....	3,000	.....
Cass.....	.....	4,000	Pike.....	.....	6,000
Columbia.....	.....	2,200	Wabash.....	1,900	2,300
Harbison.....	.....	3,500	Jefferson County:	.....	.....
Patoka.....	.....	3,670	Madison.....	.....	2,000
Elkhart County:	.....	.....	Jennings County:	.....	.....
Cleveland.....	200	.....	Bigger.....	.....	1,500
Clinton.....	375	.....	Campbell.....	.....	2,000
Jefferson.....	300	.....	Columbia.....	200	1,000
Olive.....	1,250	.....	Geneva.....	900	1,400
York.....	1,125	.....	Montgomery.....	.....	1,000
Fayette County:	.....	.....	Sand Creek.....	.....	1,200
Jennings.....	500	.....	Vernon.....	.....	1,500
Posey.....	1,000	.....	Johnson County:	.....	.....
Fountain County:	.....	.....	Clark.....	1,000	.....
Logan.....	2,000	.....	Hensley.....	2,000	.....
Richland.....	.....	6,100	Union.....	150	.....
Shawnee.....	4,000	.....	Knox County:	.....	.....
Wabash.....	2,500	.....	Decker.....	1,150	.....
Franklin County:	.....	.....	Harrison.....	3,700	.....
Blooming Grove.....	.....	3,800	Vigo.....	1,650	1,800
Highland.....	1,000	2,300	Vincennes.....	2,000	.....
Salt Creek.....	.....	3,000	Widner.....	.....	2,000
Springfield.....	3,000	4,200	Kosciusko County:	.....	.....
Fulton County:	.....	.....	Etna.....	2,900	.....
Richland.....	1850	.....	Prairie.....	4,400	.....
Union.....	.....	.....	Tippecanoe.....	3,520	.....
Gibson County:	.....	.....	Van Buren.....	4,986	.....
Center.....	.....	3,000	La Grange County:	.....	.....
Johnson.....	.....	3,200	Clearspring.....	640	.....
Union.....	2,000	.....	Greenfield.....	300	.....
.....	.....	.....	Johnson.....	400	.....

TABLE 26.—Cost data, 1909—Continued.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Lake County:	<i>Dollars.</i>	<i>Dollars.</i>	Orange County:	<i>Dollars.</i>	<i>Dollars.</i>
Calumet.....	3,000	3,000	Greenfield.....		2,000
Center.....		4,000	Northeast.....	1,250	
Hobart.....	2,000	3,000	Northwest.....		1,500
North.....		5,000	Orangeville.....		1,400
Ross.....		2,600	Orleans.....	1,800	2,000
St. Johns.....		6,000	Paoli.....		2,000
West Creek.....	4,000		Southeast.....		1,400
Laporte County:			Owen County:		
Cool Spring.....		1,800	Harrison.....		1,770
Galena.....	2,345		Marion.....		1,000
Michigan.....		3,750	Montgomery.....		1,000
Lawrence County:			Morgan.....	1,600	1,900
Flinn.....	4,600		Wayne.....	1,704	2,500
Marion.....		2,200	Parke County:		
Spice Valley.....		1,500	Howard.....	1,200	2,000
Madison County:			Union.....	1,600	1,800
Anderson.....	3,000		Pike County:		
Duck Creek.....	2,500		Jefferson.....		3,200
Fall Creek.....	1,500		Porter County:		
Green.....	2,500		Boone.....	4,500	4,000
Monroe.....	1,500	2,000	Jackson.....		5,000
Pipe Creek.....	2,200	2,500	Pine.....		4,400
Union.....	1,300		Pleasant.....		1,000
Marion County:			Portage.....	3,110	3,450
Lawrence.....	1,500	2,000	Porter.....		4,170
Wayne.....	1,700	2,200	Union.....	5,000	
Marshall County:			Posey County:		
Center.....	1,400		Black.....		3,300
Tippecanoe.....	1,800		Harmony.....	2,700	
Union.....	300		Lynn.....	3,500	
Walnut.....	1,400		Marrs.....		3,300
Martin County:			Pulaski County:		
Center.....	2,000	2,000	Jefferson.....	1,100	
Halbert.....		2,700	Monroe.....	1,000	
Miami County:			Tippecanoe.....	1,000	
Clay.....	2,800		White Post.....	2,300	2,500
Deer Creek.....	2,000		Putnam County:		
Erie.....	2,000		Madison.....	1,400	2,500
Harrison.....	2,600		Monroe.....	2,000	3,000
Jackson.....	4,600		Warren.....		2,400
Jefferson.....	2,200		Randolph County:		
Richland.....	1,500		Green.....	1,800	3,500
Monroe County:			Stony Creek.....	2,345	
Bean Blossom.....		2,200	Ward.....	1,630	2,500
Benton.....		2,000	Washington.....	1,250	
Bloomington.....		2,370	White River.....	3,000	3,300
Clear Creek.....		2,000	Ripley County:		
Indian Creek.....		2,000	Adams.....	250	2,000
Perry.....		2,250	Delaware.....		2,300
Salt Creek.....		1,000	Franklin.....		2,000
Washington.....	1,800		Otter Creek.....		2,100
Montgomery County:			Shelby.....		2,400
Coal Creek.....	1,500		Rush County:		
Franklin.....	1,800		Anderson.....		4,000
Madison.....	1,700		Orange.....	1,425	4,985
Scott.....	500	550	Washington.....	1,500	
Walnut.....	1,000		St. Joseph County:		
Morgan County:			Center.....	600	
Adams.....		2,000	Clay.....	320	
Ashland.....		1,500	Greene.....	250	
Brown.....	500	1,500	Lincoln.....	2,000	
Gregg.....	1,700		Scott County:		
Madison.....	900		Finley.....	500	700
Ray.....		1,000	Johnson.....	3,100	3,200
Washington.....	3,000		Shelby County:		
Newton County:			Brandywine.....	1,000	
Beaver.....		2,200	Noble.....	1,600	2,300
Collax.....	2,600	2,700	Washington.....	130	
Grant.....		1,800	Spencer County:		
Iroquois.....		2,000	Ohio.....		2,650
Lake.....	1,800		Starke County:		
Noble County:			Davis.....	1,800	
Albion.....	500		Oregon.....	1,200	
Elkhart.....	3,285		Washington.....	1,600	
Orange.....	750		Steuben County:		
Perry.....	150		Millgrove.....	1,000	

TABLE 26.—*Cost data, 1909—Continued.*

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Sullivan County:	<i>Dollars.</i>	<i>Dollars.</i>	Warren County—Continued.	<i>Dollars.</i>	<i>Dollars.</i>
Cass.....	3,500	4,000	Prairie.....	2,200	.....
Fairbank.....	1,000	.....	Warren.....	2,600	.....
Haddon.....	1,760	2,200	Warrick County:	.....	.....
Jackson.....	3,500	4,000	Boon.....	.....	1,725
Switzerland County:	.....	.....	Washington County:	.....	.....
Pleasant.....	.....	1,950	Gibson.....	2,000	.....
Posey.....	1,500	2,000	Jefferson.....	.....	1,200
Tippecanoe County:	.....	.....	Pierce.....	.....	1,750
Lauramie.....	1,900	3,100	Posey.....	.....	2,000
Shelby.....	2,000	.....	Washington.....	.....	1,750
Tippecanoe.....	2,200	.....	Wayne County:	.....	.....
Tipton County:	.....	.....	Boston.....	1,600	2,800
Liberty.....	1,800	2,200	Clay.....	4,400	.....
Madison.....	2,500	2,700	Harrison.....	1,000	.....
Wildcat.....	2,700	3,200	Jackson.....	4,400	.....
Union County:	.....	.....	Jefferson.....	200	.....
Harrison.....	.....	1,760	Perry.....	1,000	.....
Vanderburg County:	.....	.....	Wells County:	.....	.....
Armstrong.....	.....	2,500	Jefferson.....	1,800	2,800
Perry.....	.....	2,800	Nottingham.....	1,250	1,000
Union.....	1,760	2,750	Union.....	1,800	.....
Vermilion County:	.....	.....	White County:	.....	.....
Eugene.....	500	.....	Liberty.....	2,000	.....
Vermilion.....	1,600	.....	Union.....	1,500	3,000
Vigo County:	.....	.....	West Point.....	3,000	.....
Honey Creek.....	2,400	4,000	Whitley County:	.....	.....
Prairieon.....	1,500	.....	Columbia.....	4,400	.....
Riley.....	2,000	.....	Richland.....	4,400	.....
Sugar Creek.....	4,000	.....	Average.....	1,887	2,657
Warren County:	.....	.....	
Jordan.....	3,000	.....		
Kent.....	2,130	.....		

IOWA.

TABLE 27.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adair.....	1,200	.....	.....	.....	.....	.....
Adams.....	720	.....	.....	.....	.....	.....
Allamakee.....	1,000	0.5	.....	5	5.5	0.55
Appanoose.....	714	.....	.....	.....	.....	.....
Audubon.....	880	.....	.....	.....	.....	.....
Benton.....	1,420	.....	1.5	12.5	14	.98
Blackhawk.....	1,150	.5	51	3	54.5	4.73
Boone.....	1,440	.....	71.75	.....	71.75	4.98
Bremer.....	759	.....	16	77.75	93.75	12.35
Buchanan.....	1,184	.....	85.25	17	102.25	8.63
Buena Vista.....	1,040	.....	50	2.5	52.5	5.05
Butler.....	1,329	.....	93	2	95	7.14
Calhoun.....	1,152	.....	40	.....	40	3.47
Carroll.....	950	.....	73	3	76	8.00
Cass.....	875	.....	.....	.....	.....	.....
Cedar.....	952	.5	.....	.....	.5	.05
Cerro Gordo.....	1,132	.5	18	6	24.5	2.16
Cherokee.....	980	.....	20	.....	20	2.04
Chickasaw.....	970	1	64	2	67	6.90
Clarke.....	936	.....	.....	.....	.....	.....
Clay.....	1,100	.....	24	.....	24	2.18
Clayton.....	1,391	2	9	63.5	74.5	5.35
Clinton.....	1,220	38.75	21.5	2	62.25	5.10
Crawford.....	1,500	.....	.....	.25	.25	.01
Dallas.....	854	.....	10	2	12	1.40
Davis.....	1,500	.....	.....	.....	.....	.....

1 Includes 10 miles of oiled-gravel roads.

TABLE 27.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Decatur.....	960					
Delaware.....	787	7	32		39	4.95
Des Moines.....	900	3	50		53	5.88
Dickinson.....	610		40		40	6.55
Dubuque.....	935	57	37.1	.75	94.85	10.14
Emmet.....	644		1.5		1.5	.23
Fayette.....	1,200	3	19.5	55	77.5	6.45
Floyd.....	1,500	2.5	51.5	1	55	4.23
Franklin.....	1,152	1	36		37	3.21
Fremont.....	850					
Greene.....	1,060		150	1.5	151.5	14.29
Grundy.....	1,000					
Guthrie.....	1,600		13.5		13.5	.84
Hamilton.....	1,225		25		25	2.04
Hancock.....	934		70.5	44	114.5	12.25
Hardin.....	2,300		64.5	44	108.5	4.71
Harrison.....	500			4	4	.80
Henry.....	900					
Howard.....	829	11	17	3.5	31.5	3.79
Humboldt.....	720	12	20		32	4.44
Ida.....	430					
Iowa.....	1,008		10	7.5	17.5	1.73
Jackson.....	1,200	4.5	8		12.5	1.04
Jasper.....	480		15	2	17	3.54
Jefferson.....	1,143	3			3	.26
Johnson.....	252		.25	8.5	8.75	3.47
Jones.....	1,048	1	1	8	10	.95
Keokuk.....	1,000	110			110	11.00
Kossuth.....	1,623		10		10	.61
Lee.....	1,000	13	2		15	1.50
Linn.....	1,400	23	8	3.5	34.5	2.46
Louisa.....	689					
Lucas.....	800					
Lyon.....	1,200					
Madison.....	1,200					
Mahaska.....	1,206	3			3	.24
Marion.....	1,500					
Marshall.....	1,150		1		1	.08
Mills.....	727					
Mitchell.....	600		7		7	.87
Monona.....	1,400		.5		.5	.03
Monroe.....	864					
Montgomery.....	839					
Muscatine.....	882		2	46.5	48.5	5.49
O'Brien.....	1,082		3.5	1	4.5	.41
Osceola.....	280		4		4	1.42
Page.....	1,050					
Palo Alto.....	904	.25	2		2.25	.24
Plymouth.....	1,500					
Pocahontas.....	1,054		2		2	.18
Polk.....	987		18	1.5	19.5	1.97
Pottawattamie.....	1,500			10	10	.66
Poweshiek.....	1,150					
Ringgold.....	1,152					
Sac.....	1,152		10.5		10.5	.91
Scott.....	743	40.25	4	11	55.25	7.43
Shelby.....	1,392					
Sioux.....	1,234			10	10	.81
Story.....	576		126		126	21.87
Tama.....	1,500		3	6.25	9.25	.61
Taylor.....	900					
Union.....	900					
Van Buren.....	975					
Wapello.....	725			7	7	.96
Warren.....	1,050					
Washington.....	990					
Wayne.....	800					
Webster.....	1,244	17	6	6	29	2.33
Winnebago.....	792		6.5	55	61.5	7.76
Winnesiek.....	1,019	5	23		28	2.74
Woodbury.....	1,119		.5		.5	.04
Worth.....	612		17.5	19	36.5	5.96
Wright.....	1,150		2.5	20	22.5	1.95
Total.....	102,427	357.25	1,572.85	575	2,505.1	2.45

TABLE 27.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	102,448	241	1,403	.....	11,664	1.62
1909.....	102,427	357.25	1,572.85	575	2,505.1	2.45
Gain.....	.....	116.25	169.85	575	841.1	.83

¹ Includes 14 miles of brick roads and 6 miles of shell roads.

KANSAS.

TABLE 28.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Allen.....	570	11	.....	.....	11	1.92
Anderson.....	1,125	1	.....	.....	1	.08
Atchison.....	800	10	.....	.....	10	1.25
Barber.....	812	.....	.....	.....	.....	.....
Barton.....	1,225	.....	.....	.....	.....	.....
Bourbon.....	1,500	24.75	.....	.....	24.75	1.65
Brown.....	700	.....	.....	.....	.....	.....
Butler.....	1,200	.....	.....	.....	.....	.....
Chase.....	100	.....	.....	.....	.....	.....
Chautauqua.....	980	.....	.....	.....	.....	.....
Cherokee.....	700	.....	1 20	.....	20	2.85
Cheyenne.....	600	.....	.....	0.5	.5	.08
Clark.....	150	.....	.....	7	7	4.66
Clay.....	800	.....	.....	.....	.....	.....
Cloud.....	1,350	.....	.....	.....	.....	.....
Coffey.....	700	.....	.....	.....	.....	.....
Comanche.....	412	.....	.....	2	2	.48
Cowley.....	1,200	.75	.....	.....	.75	.06
Crawford.....	1,152	.....	.....	.....	.....	.....
Decatur.....	1,461	.....	.....	.....	.....	.....
Dickinson.....	1,634	.....	2	10	12	.73
Doniphan.....	707	1.5	.....	.....	1.5	.21
Douglas.....	1,000	4	.....	.....	4	.40
Edwards.....	638	.....	.....	40	40	6.26
Elk.....	700	1	.....	30	31	4.42
Ellis.....	700	.....	.....	.....	.....	.....
Ellsworth.....	921	.....	.....	.....	.....	.....
Finney.....	801	.....	.....	8	8	1.12
Ford.....	634	.....	.....	5	5	.78
Franklin.....	1,152	.25	.....	.....	1.41	.12
Geary.....	500	2.5	.....	.....	2.5	.50
Gove.....	169	.....	.....	.....	.....	.....
Graham.....	890	.....	.....	.....	.....	.....
Grant.....	600	.....	.....	.....	.....	.....
Gray.....	400	.....	.....	10	10	2.50
Greeley.....	214	.....	.....	.....	.....	.....
Greenwood.....	1,800	.....	.....	.....	.....	.....
Hamilton.....	125	.....	.....	5.5	5.5	4.40
Harper.....	614	.....	.....	.....	.....	.....
Harvey.....	1,128	.....	.....	.....	.....	.....
Haskell.....	500	.....	.....	.....	.....	.....
Hodgeman.....	500	.....	.....	.....	.....	.....
Jackson.....	1,000	.....	.....	.....	.....	.....
Jefferson.....	1,200	.....	.....	.....	.....	.....
Jewell.....	1,500	.....	.....	.....	.....	.....
Johnson.....	1,000	5	.....	.....	5	.50
Kearny.....	625	.....	.....	.....	.....	.....
Kingman.....	1,500	.....	.....	.75	.75	.05
Kiowa.....	388	.....	.....	.....	.....	.....
Labette.....	600	1	.....	.....	1	.16

¹ Galena chats.

² Including 1 mile of bituminous-macadam road.

³ Including 1.16 miles of bituminous-macadam roads.

TABLE 2S.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Lane.....	138					
Leavenworth.....	850	2			1.5	.58
Lincoln.....	960					
Linn.....	900					
Logan.....	1,400					
Lyon.....	890	5	2		.7	.87
McPherson.....	1,653					
Marion.....	1,784					
Marshall.....	1,600					
Meade.....	400					
Miami.....	1,150					
Mitchell.....	1,320					
Montgomery.....	1,200					
Morris.....	800					
Morton.....	150					
Nemaha.....	720					
Neosho.....	1,155	2.2	.25		25.06	.43
Ness.....	455					
Norton.....	900					
Osage.....	720					
Osborne.....	1,491					
Ottawa.....	1,320					
Pawnee.....	1,353					
Pawnee.....	1,353			25	25	1.84
Phillips.....	1,700					
Pottawatomie.....	1,400	6	3	30	39	2.73
Pratt.....	1,000					
Rawlins.....	270					
Reno.....	2,448			5	5	.20
Republic.....	700			1.5	1.5	.21
Rice.....	1,381					
Riley.....	1,100					
Rooks.....	1,560					
Rush.....	1,326					
Russell.....	1,250					
Saline.....	1,275					
Scott.....	281					
Sedgwick.....	1,548					
Seward.....	1,293			6	6	.43
Shawnee.....	1,200					
Sheridan.....	1,350					
Sherman.....	500					
Smith.....	1,750					
Stafford.....	1,000			16	16	1.60
Stanton.....	300					
Stevens.....	200					
Sumner.....	1,188					
Thomas.....	137					
Trego.....	450					
Wabaunsee.....	1,500	1	.5		1.5	.10
Wallace.....	200					
Washington.....	1,800					
Wichita.....	608					
Wilson.....	938					
Woodson.....	1,000					
Wyandotte.....	750	58			58	7.73
Total.....	98,302	136.95	27.75	202.25	374.71	.38

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	101,196	111.75	158.5		273.25	0.27
1909.....	98,302	136.95	27.75	202.25	374.71	.38
Gain.....		25.2		202.25	104.46	.11

¹ Includes 3 miles of brick roads.² Includes 2.6 miles of bituminous-macadam roads.³ Includes 30 miles of roads which have been treated with oil.⁴ Includes 3 miles of shell roads.⁵ Includes 4.76 miles of bituminous-macadam roads and 3 miles of brick roads.

TABLE 29.—*Cost data, 1909.*

County.	Average cost per mile.		County.	Average cost per mile.	
	Sand-clay.	Mac-adam.		Sand-clay.	Mac-adam.
	Dollars.	Dollars.		Dollars.	Dollars.
Allen.....		3,160	Hamilton.....	1,000	
Anderson.....		2,000	Johnson.....		7,200
Aitchison.....		5,400	Neosho.....		4,300
Bourbon.....		4,000	Stafford.....	300	
Clark.....	1,600		Wabauunsee.....		3,000
Comanche.....	1,000		Wyandotte.....		3,500
Edwards.....	300				
Finney.....	700		Average.....	785	4,070
Ford.....	600				

KENTUCKY.

TABLE 30.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Adair.....	400	5	20	25	6.25
Allen.....	400		7	7	1.75
Anderson.....	450	200		200	44.44
Ballard.....	400				
Barren.....	600	44	10	54	9.00
Bath.....	490	165		165	41.25
Bell.....	375	4		4	1.06
Boone.....	275	96.75	1	97.75	35.54
Bourbon.....	500				
Boyd.....	182	14		14	8.62
Boyle.....	300	100	175	275	91.66
Bracken.....	250	180		180	72.00
Breathitt.....	450				
Breckinridge.....	600				
Bullitt.....	380	40	15	55	14.47
Butler.....	450				
Caldwell.....	550	10	10	20	3.63
Calloway.....	400		45	45	11.25
Campbell.....	300	75		75	25.00
Carlisle.....	200				
Carroll.....	300	141	20	161	53.66
Carter.....	500				
Casey.....	650		65	65	10.00
Christian.....	1,000	260		260	26.00
Clark.....	368	208		208	56.52
Clay.....	500				
Clinton.....	200				
Crittenden.....	250				
Cumberland.....	400				
Davless.....	500	30	15	45	9.00
Edmonson.....	300		8	8	2.66
Elliott.....	300				
Estill.....	300				
Fayette.....	538	360		360	66.91
Fleming.....	565	225		225	39.82
Floyd.....	300				
Franklin.....	300	228.5		228.5	76.16
Fulton.....	250				
Gallatin.....	190	159	12	171	90.00
Garrard.....	260	135		135	51.92
Grant.....	700	350		350	50.00
Graves.....	1,000	6	6	12	1.20
Grayson.....	500	3		3	.60
Green.....	400	12		12	3.00
Greenup.....	300	1.5		1.5	.50
Hancock.....	203				
Hardin.....	1,000	155	30	185	18.50
Harlan.....	500				
Harrison.....	420	365		365	86.90
Hart.....	400	68		68	17.00
Henderson.....	550	53		106	19.27

¹ Includes 1.7 miles of bituminous-macadam roads.

TABLE 30.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Henry.....	550	200	50	250	45.45
Hickman.....	450				
Hopkins.....	1,250				
Jackson.....	300				
Jefferson.....	742				
Jessamine.....	290	203		203	70.00
Johnson.....	275	1		1	.36
Kenton.....	300	219		219	73.00
Knott.....	300				
Knox.....	700				
Larue.....	300	22	13	35	11.66
Laurel.....	600	4		4	.66
Lawrence.....	500				
Lee.....	300				
Leslie.....	400				
Letcher.....	350				
Lewis.....	506	80		80	15.81
Lincoln.....	530	82.5	200	282.5	53.30
Livingston.....	380				
Logan.....	600	75	15	90	15.00
Lyon.....	225				
McCracken.....	300		152	152	50.66
McLean.....	300				
Madison.....	900	366		366	40.66
Magoffin.....	550				
Marion.....	500	125	25	150	30.00
Marshall.....	432		60	60	13.88
Martin.....	225				
Mason.....	400	370		370	92.50
Meade.....	350	10		10	2.85
Menifee.....	250				
Mercer.....	425	235		235	55.29
Metcalfe.....	250				
Monroe.....	650				
Montgomery.....	400	110		110	27.50
Morgan.....	400				
Muhlenberg.....	500				
Nelson.....	700	237	50	287	41.00
Nicholas.....	300	253	3	256	85.33
Ohio.....	500	8		8	1.60
Oldham.....	200	85		85	42.50
Owen.....	700	315		315	45.00
Owsley.....	300				
Pendleton.....	450	310		310	66.44
Perry.....	300				
Pike.....	700				
Powell.....	400				
Pulaski.....	1,000	30	5	35	3.50
Robertson.....	110	65		65	59.09
Rockcastle.....	500				
Rowan.....	500				
Russell.....	275		5	5	1.81
Scott.....	400	363		363	90.75
Shelby.....	500	405		405	81.00
Simpson.....	500	83	33	116	23.20
Spencer.....	270	30	89	119	44.07
Taylor.....	460	30	25	55	11.95
Todd.....	200	25	10	35	17.50
Trigg.....	781	30	30	60	3.84
Trimble.....	180	65		65	36.11
Union.....	483				
Warren.....	700	225	50	275	39.28
Washington.....	500	222	27	249	49.80
Wayne.....	550	25		25	4.54
Webster.....	624				
Whitley.....	1,000		5	5	.50
Wolfe.....	500				
Woodford.....	675	202		202	29.92
Total.....	53,744	8,700.25	1,404	10,114.95	18.82

¹ Includes 1.7 miles of bituminous-macadam roads.

TABLE 30.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	57,137	8,078	1,408	9,486	16.60
1909.....	53,744	8,709.25	1,404	10,114.95	18.82
Gain.....		631.25		628.95	2.22

¹ Includes 1.7 miles of bituminous-macadam roads.TABLE 31.—*Cost data, 1909.*

County.	Average cost per mile.		County.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>
Adair.....	1,100	.....	Lewis.....	.....	1,300
Allen.....	1,100	.....	Lincoln.....	.....	1,600
Barren.....	600	1,800	Logan.....	1,200	2,500
Bourbon.....	.....	2,500	McCracken.....	500	.....
Boyd.....	.....	15,500	Madison.....	.....	2,500
Bullitt.....	800	1,500	Marion.....	.....	2,000
Caldwell.....	.....	1,750	Marshall.....	900	.....
Calloway.....	320	.....	Mason.....	.....	2,400
Carroll.....	1,000	1,200	Montgomery.....	.....	1,500
Clark.....	.....	2,000	Nelson.....	1,200	1,200
Daviess.....	.....	6,000	Nicholas.....	.....	2,000
Fayette.....	.....	2,500	Ohio.....	.....	4,500
Fleming.....	.....	1,700	Owen.....	.....	1,200
Franklin.....	.....	2,000	Pulaski.....	1,500	1,800
Gallatin.....	1,100	.....	Robertson.....	.....	1,800
Garrard.....	.....	2,000	Scott.....	.....	1,400
Grant.....	.....	1,200	Shelby.....	.....	1,200
Graves.....	700	.....	Simpson.....	1,000	1,900
Grayson.....	.....	3,000	Spencer.....	1,000	2,000
Green.....	.....	1,200	Trimble.....	1,600	.....
Hardin.....	.....	1,250	Warren.....	800	.....
Harrison.....	.....	1,400	Washington.....	1,400	1,400
Hart.....	.....	1,200	Wayne.....	.....	2,500
Henry.....	400	1,200	Whitley.....	2,000	.....
Jefferson.....	.....	3,000	Woodford.....	.....	1,700
Jessamine.....	.....	1,900	Average.....	1,011	2,158
Johnson.....	.....	6,400			
Kenton.....	.....	2,200			

¹ 2 gallons of oil per square yard applied.

LOUISIANA.

TABLE 32.—*Mileage of public roads, 1909.*

Parish. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
Acadia.....	650	.....	.....	.....	.....
Ascension.....	131	.....	.....	.....	.....
Assumption.....	200	.....	.....	.....	.....
Avoyelles.....	800	.....	.....	.....	.....
Bienville.....	425	.....	.....	.....	.....
Bossier.....	400	.....	.....	.....	.....
Caddo.....	487	1	2 ³	4	0.82
Calcasieu.....	1,000	.....	.....	2 ²	.20

¹ La Salle Parish established from Catahoula Parish in 1910.² Oiled.³ Shell road.

TABLE 32.—*Mileage of public roads, 1909—Continued.*

Parish.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
Caldwell.....	750				
Cameron.....	175				
Catahoula.....	1,260		15	15	1.25
Claiborne.....	750				
Concordia.....	300				
De Soto.....	400		75	75	18.75
East Baton Rouge.....	500	16		16	3.20
East Carroll.....	285				
East Feliciana.....	450				
Franklin.....	500				
Grant.....	250	2		2	.80
Iberia.....	400				
Iberville.....	110	5.5		5.5	5.00
Jackson.....	500				
Jefferson.....	100			15	5.00
Lafayette.....	250				
Lafourche.....	215				
Lincoln.....	500				
Livingston.....	500				
Madison.....	400				
Morehouse.....	394				
Natchitoches.....	1,500				
Orleans.....	260	30		358	96.66
Ouachita.....	360	28		28	7.77
Plaquemines.....	450				
Pointe Coupee.....	400				
Rapides.....	755		3	3	.39
Red River.....	200				
Richland.....	150		60	60	40.00
Sabine.....	400				
St. Bernard.....	50		12	36	72.00
St. Charles.....	75				
St. Helena.....	300				
St. James.....	56				
St. John the Baptist.....	32				
St. Landry.....	800				
St. Martin.....	215				
St. Mary.....	292			615	7.42
St. Tammany.....	220				
Tangipahoa.....	1,200				
Tensas.....	400				
Terrebonne.....	220			75	2.27
Union.....	250				
Vermilion.....	1,500				
Vernon.....	360				
Washington.....	400				
Webster.....	500				
West Baton Rouge.....	100				
West Carroll.....	250				
West Feliciana.....	325				
Winn.....	300				
Total.....	24,962	82.5	168	8329.5	1.32

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
1904.....	24,897	26		934	0.14
1909.....	24,962	82.5	168	8329.5	1.32
Gain.....	65	56.5	168	295.5	1.18

1 Burnt sulphur ore.

2 This does not include city streets. The city of New Orleans embraces the entire parish of Orleans.

3 Includes 28 miles of shell roads.

4 Estimated by the office of public roads.

5 Includes 21 miles of shell roads.

6 Oiled.

7 Shell road.

8 Includes 59 miles of shell roads, 5 miles of burnt sulphur ore roads, and 15 miles of oiled roads.

9 Includes 8 miles of shell roads.

TABLE 33.—*Cost data, 1909.*

Parish.	Average cost per mile.			
	Earth.	Sand-clay.	Shell.	Gravel.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Calcasieu.....		250	1,000	
Cameron.....		75		
Catahoula.....		100		
De Soto.....		500		
East Baton Rouge.....	75			
Grant.....				2,700
Ouachita.....				1,500
Rapides.....		1,000		
Richland.....		2,000		
St. Bernard.....			5,000	
St. Tammany.....	125			
Average.....	100	654	3,000	2,100

MAINE.

TABLE 34.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Improved earth. ¹	Total.	
Androscoggin.....	1,352	² 3.68	205	0.65	209.33	15.48
Aroostook.....	2,317	11	148	16.52	175.52	7.57
Cumberland.....	2,381	² 23.73	443.5	5.45	472.68	19.85
Franklin.....	1,120	1.5	107	3.9	112.4	10.03
Hancock.....	1,504	17.37	103.25	2.9	123.52	8.21
Kennebec.....	1,824	8	127	6.71	141.71	7.76
Knox.....	816	.5	67	2.2	69.7	8.54
Lincoln.....	887	2.5	24	4.9	31.4	3.54
Oxford.....	2,302	6	200	4.72	210.72	9.15
Penobscot.....	2,565	3.25	365	19.7	387.95	15.12
Piscataquis.....	888	.4	31	15.64	47.04	5.29
Sagadahoe.....	548	⁴ 1.84	20	1.19	23.03	4.20
Somerset.....	1,990	⁵ 3.94	162	7.44	173.38	8.88
Waldo.....	1,448	.5	55	14.41	70.91	4.89
Washington.....	1,338	9	237	3.24	249.24	18.62
York.....	2,308	⁶ 5.13	198	1.4	204.53	8.86
Total.....	25,528	⁷ 98.34	2,493.75	110.97	2,703.06	10.89

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Improved earth. ¹	Total.	
1904.....	25,528	87.54	2,236		2,323.54	9.10
1909.....	25,528	⁷ 98.34	2,493.75	110.97	2,703.06	10.89
Gain.....		10.80	257.75	110.97	379.52	1.49

¹ Roads which have been graded and properly drained.² Includes 0.18 mile of bituminous-macadam road.³ Includes 0.73 mile of bituminous-macadam road.⁴ Includes 0.09 mile of bituminous-macadam road.⁵ Includes 0.14 mile of bituminous-macadam road.⁶ Includes 0.13 mile of bituminous-macadam road.⁷ Includes 1.27 miles of bituminous-macadam roads.

TABLE 35.—*Cost data, 1909.*

County.	Average cost per mile.			
	Earth.	Gravel.	Macadam.	Bituminous.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Androscoggin.....	3,062	4,400	17,635	23,073
Aroostook.....	2,640	3,800	6,864	.....
Cumberland.....	3,590	2,957	10,771	24,394
Franklin.....	3,696	4,330	6,650	.....
Hancock.....	3,010	3,854	12,091	.....
Kennebec.....	4,541	3,115	8,448	.....
Knox.....	6,072	6,072	6,494	.....
Lincoln.....	2,429	4,594	8,342	.....
Oxford.....	2,112	3,326	5,702	.....
Penobscot.....	2,376	3,379	5,227	.....
Piscataquis.....	5,122	3,802	8,606	.....
Sagadahoc.....	3,538	3,643	7,339	15,154
Somerset.....	4,277	2,482	7,286	16,104
Waldo.....	3,696	2,851	18,536	.....
Washington.....	7,656	2,640	4,541	.....
York.....	4,435	3,749	9,821	.....
Average.....	3,891	3,687	9,022	19,681

MARYLAND.

TABLE 36.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Stone.	Shell.	Total.	
Allegany.....	693	.....	80	.....	80	11.54
Anne Arundel.....	521	37	8.5	112	157.5	30.23
Baltimore.....	1,291	.....	483	130	613	47.48
Calvert.....	335	65	.....	.....	65	19.40
Caroline.....	706	1	11.5	8.5	24	3.39
Carroll.....	800	.....	47	.....	47	5.87
Cecil.....	638	10	16.5	.....	26.5	4.15
Charles.....	465	86	.....	1	87	18.70
Dorchester.....	810	.....	5	40	45	5.55
Frederick.....	1,280	.....	112	.....	112	8.75
Garrett.....	940	.....	27.5	.....	27.5	2.92
Harford.....	830	205	90	.....	295	35.54
Howard.....	448	5	54.5	.....	59.5	13.28
Kent.....	427	3	3.3	2	8.3	1.94
Montgomery.....	835	.....	43	.....	43	5.14
Prince Georges.....	892	51	19	.....	70	7.84
Queen Annes.....	839	.....	13	.....	13	1.54
St. Marys.....	602	25	.....	5	30	4.98
Somerset.....	515	.....	3	30	33	6.40
Talbot.....	450	.....	11	40	51	11.33
Washington.....	799	.....	164	.....	164	20.52
Wicomico.....	825	.....	9	40	49	8.36
Worcester.....	832	.....	22	.....	22	2.64
Total.....	16,773	488	1,222.8	408.5	* 2,142.3	12.77

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Gravel.	Stone.	Shell.	Total.	
1904.....	16,773	480	840	250	1,570	9.36
1909.....	16,773	488	1,222.8	408.5	* 2,142.3	12.77
Gain.....	.....	8	382.8	158.5	572.3	3.41

¹ Baltimore City County has no rural roads; the entire county is included in the city of Baltimore.² Including 3 miles of sand-clay roads.³ Including 20 miles of sand-clay roads.⁴ Including 23 miles of sand-clay roads.

TABLE 37.—*Cost data, 1909.*

County.	Average cost per mile.				
	Earth.	Sand-clay.	Gravel.	Shell.	Macadam.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Allegany.....					9,600
Anne Arundel.....			1,000	1,000	7,000
Baltimore.....					(1)
Caroline ²		3,000		5,000	³ 6,000
Charles.....			⁴ 1,000		⁵ 7,200
Dorchester.....				3,000	9,000
Frederick.....	800				(6)
Harford.....					7,500
Howard.....					12,800
Queen Anne.....					11,000
Somerset.....				500	12,000
Talbot.....				3,000	6,500
Washington.....					1,500
Wicomico.....		550		5,400	8,900
Worcester.....					7,500
Average.....	800	1,775	1,000	2,984	8,192

¹ Bituminous resurfacing and pouring about 3 gallons per square yard, which cost \$0.75 per square yard. Oiling macadam road cost \$0.03 $\frac{1}{2}$ per square yard.

² Caroline County has one marl road which cost \$3,500 per mile.

³ This is a shell-macadam road.

⁴ Not including grading of hills of over 6 per cent; gravel consolidated by traffic.

⁵ This is a gravel-macadam road.

⁶ County roads cost \$2,500 per mile; State roads cost \$7,000 per mile.

MASSACHUSETTS.

TABLE 38.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Total.	Approximate percentage of roads improved.
		Stone.		Gravel.			
		By towns.	By State.	By towns.	By State.		
Barnstable.....	1,024	143	93.24	62	.....	298.24	29.12
Berkshire.....	1,475	54	47.65	266	11.99	379.64	25.73
Bristol.....	963	128	62.85	668	4.59	863.44	89.66
Dukes.....	196	22	17.06	12	.....	51.06	26.05
Essex.....	1,090	171	59.24	628	7.48	865.72	79.42
Franklin.....	1,459	65	43.62	55	2.40	166.02	11.37
Hampden.....	1,143	51	46.76	197	5.54	300.30	26.27
Hampshire.....	1,186	36	35.35	174	1.92	247.27	20.84
Middlesex.....	2,073	286	101.56	1,480	11.41	1,878.97	90.64
Nantucket.....	114	3	6.48	6	.....	15.48	13.57
Norfolk.....	1,253	151	52.13	833	2.19	1,038.32	82.86
Plymouth.....	1,458	192	86.08	1,150	4.36	1,432.44	98.24
Suffolk.....	1,80	6	3.60	54	.....	63.60	79.50
Worcester.....	3,758	208	125.04	520	9.64	862.68	22.95
Total.....	17,272	1,516	780.66	6,105	61.52	8,463.18	49.00

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Total.	Approximate percentage of roads improved.
		Stone.		Gravel.			
		By towns.	By State.	By towns.	By State.		
1904.....	17,092	689	523.73	6,579	42.14	² 7,843.87	45.89
1909.....	17,272	1,516	780.66	6,105	61.52	8,463.18	49.00
Gain.....	180	827	256.93	.....	19.38	629.31	3.11

¹ This county includes the cities of Boston and Chelsea and the towns of Revere and Winthrop.

² Includes 8 miles of shell roads and 2 miles of tarred roads.

TABLE 39.—Cost data,¹ 1909.

Town or city.	Square yards.	Miles.	Cost per mile.	Town or city.	Square yards.	Miles.	Cost per mile.
			<i>Dollars.</i>				<i>Dollars.</i>
Agawam ²	7,705	0.876	11,530.01	Marshfield ²	6,498	0.738	6,307.77
Attleboro.....	6,500	.740	5,651.01	Millford.....	5,488	.624	8,528.00
Becket (1908).....	31,083	3.532	12,005.24	Montague.....	5,308	.603	8,177.18
Billerica (1908).....	5,088	.578	9,909.05	Norton (1908).....	6,957	.790	5,569.50
Chilmark (1908) ³	5,332	.814	5,798.46	Oxford (1908).....	5,500	.625	8,707.60
Chester - Hunting- ton.....	11,367	1.292	7,737.47	Oxford (1909) ²	6,313	.718	8,212.74
Clarksburg (1907-1909).....	4,152	.478	15,122.17	Palmer (1908).....	30,450	3.441	10,214.65
Deerfield ²	5,245	.600	14,646.73	Randolph.....	4,553	.517	5,212.90
Dighton (1908).....	5,943	.677	5,920.97	Rowley ⁴	12,331	1.401	4,837.42
Duxbury ²	6,070	.690	7,435.24	Scituate ²	4,500	.510	11,654.71
Erving.....	5,755	.654	10,590.24	South Hadley.....	5,473	.622	11,154.29
Foxboro (1908).....	5,963	.677	5,922.62	Sterling.....	5,333	.606	7,900.64
Harwich - Brew- ster - Orleans (1908) ⁴	10,301	1.951	4,572.35	Sunderland.....	1,488	.170	9,388.94
Holden (1908).....	3,217	.366	7,060.25	Tyngsboro.....	16,423	1.867	8,026.61
Ipswich.....	7,750	.881	9,221.06	Wareham - Roches- ter ⁴	13,743	1.562	3,723.92
Littleton.....	4,553	.521	1,420.40	West Newbury.....	12,085	1.373	9,461.47
Marlboro (1908) ⁵	7,160	.814	5,858.75	Weymouth (1908).....	7,750	.881	4,653.42
				Total, or aver- age.....	283,407	33.189	78,003.94

¹ These include information concerning the cost of macadam, bituminous-macadam, and sand-oil roads.

² Includes cost of bituminous surfacing.

³ Macadam 12 feet in width.

⁴ Sand and oil mixture greater than 3 inches in thickness.

⁵ Gravel road with sand-oil surface.

⁶ Includes 2,420 feet of gravel; balance macadam.

⁷ Exclusive of bridges.

MICHIGAN.

TABLE 40.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Alcona.....	397			25	25	6.29
Alger.....	290	7.5	2.83	24.4	34.73	11.97
Allegan.....	1,665.5		363		363	21.79
Alpena.....	426		195.5		195.5	45.89
Antrim.....	723		33.33	20	53.33	7.37
Arenac.....	457		3	2	5	1.09
Baraga.....	197	2.25		65	67.25	34.13
Barry.....	1,109		17	12	29	2.61
Bay.....	668.5	1.148		25	173	25.88
Benzie.....	514		26.25	11.5	37.75	7.34
Berrien.....	1,205	.25	110	38.5	148.75	12.34
Branch.....	1,004		18	2.75	20.75	2.06
Calhoun.....	1,284	4.13	9.72		13.85	1.09
Case.....	907		33.67	16	49.67	5.47
Charlevoix.....	573.5		37	35	74	12.89
Cheboygan.....	611.5	12.5	21.25	63.75	97.5	15.94
Chippewa.....	466		232.25	61.5	293.75	61.71
Clare.....	656		3.75	1.5	5.25	0.80
Clinton.....	1,171.5		62.5	3	65.5	5.59
Crawford.....	237.5		6.5	1	7.5	3.15
Delta.....	501.5	25.75	77.5	20	123.25	24.57
Dickinson.....	194	13.69	3.7	42	59.36	30.57
Eaton.....	1,049.5		28.5	11.5	40	3.81
Emmet.....	677.5	3	24.5	16.5	44	6.49
Genesee.....	1,245.5		31	25	56	4.49
Gladwin.....	395.5		2	34.5	36.5	9.22
Gogebic.....	136.5			75	75	54.94
Grand Traverse.....	672		50.25	2	52.25	7.77
Gratiot.....	1,238		140.5	44	184.5	14.90
Hillsdale.....	1,232		40.5	48	88.5	7.18
Houghton.....	309	8	18.25	82.25	108.5	35.11
Huron.....	1,512	11.8	4	3	18.8	1.24

¹ Includes 5 miles of bituminous-macadam roads.

² Includes 50 miles of gravel-stone road.

³ Includes 1 mile of bituminous-macadam road.

TABLE 40.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Ingham.....	1,037	1.33	22	50	73.33	7.07
Ionia.....	1,113.5	3	45.75	29	77.75	6.98
Iosco.....	412	.....	2	1.5	3.5	.84
Iron.....	607	1	87	81	169	27.84
Isabella.....	1,011	.....	12	21	33	3.26
Jackson.....	1,259	.....	23	32	55	4.36
Kalamazoo.....	1,041	.....	44.5	22.5	67	6.43
Kalkaska.....	549.5	2	23.75	11	36.75	6.68
Kent.....	1,666.5	.....	143.5	67	210.5	12.63
Keweenaw.....	250	34	48.5	16	96.5	38.60
Lake.....	553.5	.....	5	4	9	1.62
Lapeer.....	1,174.5	.....	3.5	12.5	16	1.36
Leelanau.....	493.5	.....	31.5	21	52.5	10.63
Lenawee.....	1,492.5	.....	103	10	113	7.57
Livingston.....	945	.....	24.92	30	54.92	5.81
Luce.....	193.5	3	7	43.5	53.5	27.64
Mackinac.....	361	56.9	140	17.75	214.65	59.45
Macomb.....	875.5	10	40	.....	50	5.71
Manistee.....	679	1.25	67.5	25.25	94	13.84
Marquette.....	541.5	11.75	17.5	45	74.25	13.71
Mason.....	598.5	.....	3	42.5	45.5	7.60
Mecosta.....	1,096	.....	25	.....	25	2.28
Menominee.....	579.5	10.75	91	78	179.75	31.01
Midland.....	633.5	.....	3.5	16	19.5	3.07
Missaukee.....	328	.....	19.75	1	20.75	6.32
Montro.....	1,111.5	9.6	.....	1	10.6	.95
Montcalm.....	1,514.5	1	23	126.5	150.5	9.93
Montmorency.....	215.5	.....	25	2	27	12.52
Muskegon.....	933	29.5	42	22	93.5	10.02
Newaygo.....	1,272	1	33.75	9.75	44.5	3.49
Oakland.....	1,662	.....	100.16	36.75	136.91	8.23
Oceana.....	944.5	11.64	39.5	3.75	54.89	5.81
Ogemaw.....	599.5	1.5	.....	17.5	19	3.16
Ontonagon.....	750	.....	19	268.5	287.5	38.33
Osceola.....	841	2.5	16	48.5	67	7.96
Oscoda.....	172.5	.....	.....	14.25	14.25	8.26
Otsego.....	433.5	.....	2.25	26	28.25	6.51
Ottawa.....	1,192.5	.....	57	3.25	60.25	5.05
Presque Isle.....	461	2.25	14.75	38	55	11.93
Roscommon.....	183.5	.....	8.75	14	22.75	12.39
Saginaw.....	1,545	173.25	31.75	8	213.5	13.81
St. Clair.....	1,402.5	1	1	13	15	1.06
St. Joseph.....	976.5	.....	65	11	76	8.71
Sanilac.....	1,785	32	9	3	44	2.46
Schoolcraft.....	285	12	13	76.75	101.75	35.70
Shiawassee.....	1,043	2	29.5	55	86.5	8.29
Tuscola.....	1,732	59.75	20.5	31	111.25	6.42
Van Buren.....	1,275.5	.....	381	40.75	421.75	33.06
Washtenaw.....	1,300	10	115	6	131	10.07
Wayne.....	1,373	20.5	17.25	8.75	46.5	3.38
Wexford.....	694.5	4.5	78	7.5	90	12.95
Total.....	68,906	3 747.81	3,770.58	2,381.65	1 6,900.54	10.01

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	69,296	248.5	6,777	.....	7,025.5	10.14
1909.....	68,906	747.81	3,770.58	2,381.65	1 6,900.54	10.01
Gain.....	.....	499.31	.....	2,381.65	.....	.....

¹ Includes 0.5 mile of bituminous-macadam road.

² Includes 5 miles of bituminous-macadam roads.

³ Includes 186.75 miles of stone-gravel and gravel-stone roads located in different counties, but not included in the above table.

TABLE 41.—Cost data, 1909.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Allegan County:	<i>Dollars.</i>	<i>Dollars.</i>	Kalkaska County—Contd.	<i>Dollars.</i>	<i>Dollars.</i>
Wayland.....	2,471	.....	Boardman.....	1,608	.....
Antrim County:			Clearwater.....	1,417	.....
Mancelona.....	2,739	.....	Cold Springs.....	2,492	.....
Do.....	1,856	.....	Excelsior.....	12,943	.....
Star.....	1,554	.....	Orange.....	2,346	.....
Barry County:			Rapid River.....	1,884	.....
Rutland.....	1,075	.....	Wilson.....	3,206	.....
Bay County:			Kent County:		
Bangor.....		3,253	Byron.....	2,494	.....
Beaver.....		3,972	Grand Rapids.....	3,488	.....
Frankenlust.....		3,641	Paris.....	4,013	.....
Fraser.....		3,013	Sparta.....	2,087	.....
Hampton.....		2,640	Tyrone.....	1,075	.....
Kawkawlin.....		2,953	Walker.....	3,007	.....
Montmorency.....		4,300	Lake County:		
Orton.....		4,528	Newkirk.....	610	.....
Ortsmouth.....		5,256	Macomb County:		
Do.....		.....	Warren.....		5,089
Benzie County:			Manistee County:		
Benzonia.....		1,421	Bear Lake.....	1,903	.....
Homestead.....	2,145	.....	Brown.....	1,460	.....
Berrien County:			Filer.....	1,180	.....
Royalton.....		4,844	Manistee.....	1,710	.....
St. Joseph.....		4,700	Onekama.....	4,905	.....
Calhoun County:			Pleasanton.....	3,178	.....
Battle Creek.....		853	Marquette County:		
Emmett.....	2,624	.....	Marquette.....		6,984
Newton.....	988	.....	Negaunee.....		9,694
Cheboygan County:			Mason County:		
Benton.....	12,460	.....	Amber.....		3,038
Do.....	12,476	.....	Grant.....	1,122	.....
Clare County:			Pere Marquette.....		2,913
Grant.....	1,650	.....	Riverton.....		4,200
Do.....	1,535	.....	Sheridan.....	1,054	.....
Delta County:			Mecosta County:		
Bark River.....		3,980	Morton.....	496	.....
Ford River.....		3,522	Wheatland.....	1,900	.....
Wells.....		4,778	Menominee County:		
Dickinson County:			Ingallston.....	1,517	.....
Breitung.....		3,696	Menominee.....		2,042
Do.....		4,439	Nadeau.....		2,511
Do.....		4,808	Stephenson.....	1,550	.....
Norway.....		5,137	Monroe County:		
Eaton County:			Bedford.....		1,470
Eaton.....	1,091	.....	Montcalm County:		
Eaton Rapids.....	1,164	.....	Cato.....	900	.....
Hamlin.....	838	.....	Douglass.....	1,125	.....
Grand Traverse County:			Muskegon County:		
Whitewater.....	1,340	.....	Casnovia.....	2,246	.....
Griot County:			Dalton.....		4,097
Arcada.....		461	Egelston.....		3,807
Do.....		749	Holton.....		4,644
Bethany.....		1,870	Muskegon.....		3,653
Emerson.....		946	Norton.....		4,360
Pine River.....		490	Oakland County:		
Sumner.....		656	Bloomfield.....	1,949	.....
Huron County:			Oceana County:		
Sand Beach.....		1,965	Golden.....		3,323
Sebewaing.....		.....	Hart.....		4,145
Verona.....		1,494	Newfield.....	617	.....
Winsor.....		2,528	Shelby.....		2,071
Ingham County:			Osceola County:		
Lansing.....	1,740	.....	Evart.....	1,124	.....
Meridian.....	2,028	.....	Hersey.....	1,454	.....
Iosco County:			Marion.....	2,115	.....
Grant and Reno ²		2,608	Orient.....	1,542	.....
Do.....		3,820	Osceola.....	1,823	.....
Isabella County:			Saginaw County:		
Coe.....	1,597	.....	Birch Run.....		3,600
Jackson County:			Blumfield.....		4,636
Henrietta.....		2,778	Bridgeport.....		3,841
Do.....		6,422	Buena Vista.....		2,430
Kalkaska County:			Do.....		4,265
Boardman.....		3,610			

¹ This is gravel-macadam construction.² These 2 townships report the cost data jointly.³ The cost of engineering on this road was \$3,563.⁴ The cost of grading on this road amounted to \$2,477.

TABLE 41.—Cost data, 1909—Continued.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Saginaw County—Contd.	<i>Dollars.</i>	<i>Dollars.</i>	Tuscola County:	<i>Dollars.</i>	<i>Dollars.</i>
Carrollton.....	3,320		Almer.....		4,638
Chesaning.....		3,140	Arbela.....	2,514	
Frankenmuth.....		4,019	Elkland.....	722	
James.....		3,550	Ellington.....	1,973	
Jonesfield.....		3,963	Elmwood.....	1,410	
Kochville.....		5,163	Indian Fields.....	2,748	
Maple Grove.....		3,199	Millington.....	2,052	
Saginaw.....		2,630	Van Buren County:		
Do.....		4,405	Geneva.....	1,927	
Thomastown.....		4,322	Wayne County:		
St. Clair County:			Ecorse.....		6,580
Port Huron.....		6,350	Greenfield.....		12,128
Do.....		4,504	Hamtramck.....		6,681
Do.....		5,925	Monguagon.....		6,156
Sanilac County:			Wexford County:		
Lexington.....		2,350	Henderson.....	1,667	
Shiawassee County:			Average.....	1,843	4,346
Bennington.....	1,125				

MINNESOTA.

TABLE 42.—Mileage of public roads, 1909.

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Aitkin.....	690		10		10	1.44
Anoka.....	578	2	30	65	97	16.78
Becker.....	1,220		20		20	1.63
Beltrami.....	500					
Benton.....	649	5	41		46	7.08
Big Stone.....	779					
Blue Earth.....	1,341	1	40		41	3.05
Brown.....	955		112		112	11.60
Carlton.....	436	1	78		79	18.11
Carver.....	523		50		50	9.56
Cass.....	940					
Chippewa.....	1,013					
Chisago.....	750		40		40	5.33
Clay.....	764		139		139	18.19
Clearwater.....	607					
Cook.....	250		120		120	48.00
Cottonwood.....	1,170		50		50	4.27
Crow Wing.....	490		83	7	90	18.36
Dakota.....	818		100	60	160	19.55
Dodge.....	812		210		210	25.86
Douglas.....	1,036		145	30	175	16.89
Faribault.....	1,174		49		49	4.17
Fillmore.....	1,500					
Freeborn.....	1,036		27		27	2.53
Goodhue.....	1,259	2	67		69	5.48
Grant.....	824		1.5		1.5	.18
Hennepin.....	952	37	80.5		117.5	12.34
Houston.....	670	2	10		12	1.79
Hubbard.....	600			.5	.5	.08
Isanti.....	600					
Itasca.....	1,200		25		25	2.04
Jackson.....	1,228					
Kanabec.....	391					
Kandiyohi.....	1,079		134	80	214	19.83
Kittson.....	1,250					
Koochiching.....	(²)					
Lac qui Parle.....	1,442		36		36	2.49
Lake.....	300		20		20	6.66

¹ Pennington County established from part of Red Lake County, November, 1910.² This county failed to make a report concerning its roads.

TABLE 42.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Le Sueur.....	788		36		36	4.59
Lincoln.....	902		5		5	.55
Lyon.....	1,208		50	1	51	4.22
McLeod.....	516		400		400	49.01
Mahnomen.....	(1)					
Marshall.....	1,820			94	94	5.16
Martin.....	1,183		100		100	8.43
Meeker.....	755	1	15		16	2.11
Mille Lacs.....	595	2	31	15	48	8.06
Morrison.....	1,305	.75		400	460.75	35.30
Mower.....	1,240		2	5	7	.56
Murray.....	1,200		15		15	1.25
Nicollet.....	612		105		105	17.15
Nobles.....	1,400					
Norman.....	1,300					
Olmsted.....	1,012		300		300	29.64
Otter Tail.....	2,509		138		138	5.52
Pine.....	664		10		10	1.50
Pipestone.....	850		11		11	1.29
Polk.....	3,009		233		233	7.74
Pope.....	1,253		25		25	1.99
Ramsey.....	261	39.6	14		53.6	20.53
Red Lake.....	723		60		60	8.29
Redwood.....	1,447		104		104	7.18
Renville.....	1,600	2	20	75	97	6.06
Rice.....	892		133	1	134	15.02
Rock.....	930					
Roseau.....	150		41	10	51	34.00
St. Louis.....	879		² 125		125	14.22
Scott.....	600		20		20	3.33
Sherburne.....	638	1	5	5	11	1.72
Sibley.....	920		32.5	7	39.5	4.29
Stearns.....	1,945	.5	50		50.5	2.59
Steele.....	724		100	30	130	17.95
Stevens.....	927		10		10	1.07
Swift.....	823		30	48	78	9.47
Todd.....	1,083		20	1	21	1.93
Traverse.....	910					
Wabasha.....	782	20	10		30	3.83
Wadena.....	750			1	1	.13
Waseca.....	687		21		21	3.05
Washington.....	616	.5	.5		1	.16
Watsonwan.....	762		10	50	60	7.87
Wilkin.....	665					
Winona.....	977	20	6	6	32	3.27
Wright.....	1,088		140		140	12.86
Yellow Medicine.....	1,263		82		82	6.49
Total.....	79,323	137.35	² 4,228	1,051.5	5,416.85	6.83

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	79,324	67.5	6,179		³ 6,247.5	7.87
1909.....	79,323	137.35	² 4,228	1,051.5	5,416.85	6.83
Gain.....		69.85		1,051.5		

¹ This county failed to make a report concerning its roads.² Includes 20 miles of roads dressed with iron ore.³ Includes 1 mile of brick road.

TABLE 43.—*Cost data, 1909.*

County.	Average cost per mile.			
	Earth.	Sand-clay.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Anoka.....			1,500	4,000
Benton.....				3,500
Blue Earth.....			500	2,500
Carver.....			1,500	
Goodhue.....			600	1,700
Hennepin.....			1,000	3,500
Kittson.....	250			
Lincoln.....			1,000	
McLeod.....			1,000	
Morrison.....		1,200		
Nicollet.....		600	1,200	
Pine.....	300			
Ramsey.....				6,000
St. Louis.....			600	
Sherburne.....			800	
Sibley.....			800	
Steele.....		500	900	
Todd.....			1,700	
Wabasha.....				1,700
Waseca.....			150	
Winona.....			(1)	(2)
Average.....	275	766	946	3,280

¹ \$0.15 per square yard.² \$0.65 per square yard for country roads and \$1.20 per square yard for city roads.

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TABLE 44.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adams.....	238		20		20	8.40
Alcorn.....	500		15		15	3.00
Amite.....	750					
Attala.....	670					
Benton.....	500					
Bolivar.....	1,500			100	100	6.66
Calhoun.....	600					
Carroll.....	651					
Chickasaw.....	350		3		3	.85
Choctaw.....	375					
Claiborne.....	450					
Clarke.....	558					
Clay.....	351		5.5		5.5	1.55
Coahoma.....	390		9		² 10	2.55
Copiah.....	840		5		5	.59
Covington.....	600					
De Soto.....	550		6		6	1.09
Forrest.....	200	2			2	1.00
Franklin.....	250					
Greene.....	500					
Grenada.....	300					
Hancock.....	350					
Harrison.....	350				³ 20	5.71
Hinds.....	800					
Holmes.....	615					
Issaquena.....	300					
Itawamba.....	600		25		25	4.16
Jackson.....	250					
Jasper.....	600					
Jefferson.....	480					
Jefferson Davis.....	350					
Jones.....	650					
Kemper.....	730					
Lafayette.....	700	.5	.25		.75	.10
Lamar.....	371					
Lauderdale.....	800			3	3	.37

¹ George County established from parts of Greene and Jackson counties March, 1910.² Includes 1 mile of burnt-clay road constructed several years ago at Clarksdale, which proved entirely satisfactory.³ Surfaced with 20 miles of shell.

TABLE 44.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Lawrence.....	500					
Leake.....	600					
Lee.....	500		8		8	1.60
Leflore.....	350					
Lincoln.....	400					
Lowndes.....	275					
Madison.....	500					
Marion.....	300					
Marshall.....	669					
Monroe.....	760		20		20	2.63
Montgomery.....	350					
Neshoba.....	500					
Newton.....	700					
Noxubee.....	650					
Oktibbeha.....	450					
Panola.....	700					
Pearl River.....	325					
Perry.....	500					
Pike.....	570					
Pontotoc.....	600					
Prentiss.....	425		10		10	2.35
Quitman.....	500					
Rankin.....	600					
Scott.....	200					
Sharkey.....	225					
Simpson.....	350					
Smith.....	600					
Sunflower.....	500	50			50	10.00
Tallahatchie.....	600					
Tate.....	400					
Tippah.....	600					
Tishomingo.....	222					
Tunica.....	225					
Union.....	662					
Warren.....	800		36		36	4.50
Washington.....	500					
Wayne.....	450					
Webster.....	500					
Wilkinson.....	350					
Winston.....	467					
Yalobusha.....	400					
Yazoo.....	975		3		3	.30
Total.....	39,619	52.5	165.75	103	¹ 342.25	.86

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	38,698		109		¹ 149	0.31
1909.....	39,619	52.5	165.75	103	² 342.25	.86
Gain.....	921	52.5	56.75	103	193.25	.55

¹ Includes 40 miles of shell roads.² Includes 1 mile of burnt-clay road and 20 miles of shell roads.TABLE 45.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Earth.	Gravel.	Macadam.		Earth.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Adams.....		1,000		Marion.....	38		
Alcorn.....			2,000	Marshall.....	19		
Clay.....			8,270	Monroe.....		650	
Coahoma.....	275	5,000		Prentiss.....		2,000	
De Soto.....		1,200		Winston.....	16		
Jackson.....	135			Average.....	97	2,058	5,135
Lee.....		2,500					

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TABLE 46.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Adair.....	900				
Andrew.....	725	1		1	0.13
Atechison.....	900				
Audrain.....	1,170				
Barry.....	1,350		33	33	2.44
Barton.....	1,150		5	5	.43
Bates.....	1,530				
Benton.....	1,418		8	8	.56
Bollinger.....	1,125		4	4	.35
Boone.....	1,381	1	58	59	4.27
Buchanan.....	1,050	18		18	1.71
Butler.....	1,242		2	2	.16
Caldwell.....	855				
Callaway.....	1,440		25	25	1.73
Camden.....	1,240				
Cape Girardeau.....	1,010	11	175	186	18.41
Carroll.....	1,215	.5		.5	.04
Carter.....	873				
Cass.....	1,323	8		8	.60
Cedar.....	630				
Chariton.....	1,211				
Christian.....	900				
Clark.....	900				
Clay.....	720	2.5		2.5	.34
Clinton.....	900				
Cole.....	540	40.5	141	181.5	33.61
Cooper.....	852	2		2	.23
Crawford.....	² 1,283				
Dade.....	630				
Dallas.....	625				
Daviess.....	1,000	2		2	.20
Dekalb.....	704				
Dent.....	630		5	5	.79
Douglas.....	1,350				
Dunklin.....	900		5	5	.55
Franklin.....	1,553	50	250	300	19.31
Gasconade.....	900	29	252	281	31.22
Gentry.....	743				
Greene.....	1,148	36.5	60	96.5	8.41
Grundy.....	743				
Harrison.....	1,260				
Henry.....	1,300				
Hickory.....	697		5	5	.71
Holt.....	800				
Howard.....	630				
Howell.....	808				
Iron.....	450	20	20	40	8.88
Jackson.....	1,000	³ 218		218	21.80
Jasper.....	900	6	⁴ 548	554	61.55
Jefferson.....	1,000	100	40	140	14.00
Johnson.....	1,455	1.5		1.5	.10
Knox.....	756				
Laclede.....	1,033		5	5	.48
Lafayette.....	1,034				
Lawrence.....	1,000	6	52	58	5.80
Lewis.....	863	20	10	30	3.47
Lincoln.....	1,061	13	35	48	4.52
Linn.....	954				
Livingston.....	900	2		2	.22
McDonald.....	670				
Macon.....	1,410	2		2	.13
Madison.....	854		10	10	1.17
Maries.....	900				
Marion.....	740		235	235	31.75
Mercer.....	742				
Miller.....	1,037				
Mississippi.....	700			1	.14
Monteau.....	800	75	75	150	18.75

¹ St. Louis City County has no rural roads; the entire county is included in the city of St. Louis.

² This county reports 53 miles of rock and gravel roads, and 103 miles of graded and gravel roads. It is understood that these roads are natural gravel and chert, and should not therefore be classed as improved roads.

³ It is claimed that these are the best roads in the State.

⁴ These roads are surfaced with cherts, which is a by-product of the zinc mines.

⁵ Includes 1 mile of sand-clay road.

TABLE 46.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Monroe.....	1,150		170	170	14.73
Montgomery.....	900		6	6	.65
Morgan.....	1,025		75	75	7.31
New Madrid.....	1,100				
Newton.....	775		100	100	12.90
Nodaway.....	1,500				
Oregon.....	775				
Osage.....	1,040	50	50	100	9.61
Ozark.....	775				
Pemiscot.....	800	1.75		1.75	.31
Perry.....	600		175	175	29.16
Pettis.....	1,188	42	15.5	57.5	4.84
Phelps.....	1,162				
Pike.....	1,050	2.5	133	135.5	12.90
Platte.....	600				
Polk.....	1,075				
Pulaski.....	990		20	20	2.22
Putnam.....	885				
Ralls.....	825	100	100	200	24.24
Randolph.....	840	2		2	.23
Ray.....	975				
Reynolds.....	625				
Ripley.....	1,080				
St. Charles.....	720	20	150	170	23.61
St. Clair.....	1,220				
St. Francois.....	780	32	6	38	4.87
St. Louis.....	1,180	319	107	426	36.10
Ste. Genevieve.....	520	5	100	105	20.19
Saline.....	1,253				
Schuyler.....	475				
Scotland.....	775				
Scott.....	700	1	5	6.25	.89
Shannon.....	840				
Shelby.....	705		20	20	2.83
Stoddard.....	1,065		10	10	.93
Stone.....	450				
Sullivan.....	1,122				
Taney.....	540				
Texas.....	990				
Vernon.....	1,462				
Warren.....	700		91	91	13.00
Washington.....	1,290		85	85	6.59
Wayne.....	1,232		20	20	1.62
Webster.....	740		6	6	.81
Worth.....	346				
Wright.....	630		10	10	1.59
Total.....	107,923	1,240.75	3,512.5	3 4,755.5	4.40

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	108,133	861.50	1,871.5	2,733	2.53
1909.....	107,923	1,240.75	3,512.5	3 4,755.5	4.40
Gain.....		379.25	1,641	2,022.5	1.87

¹ Includes 1 mile of sand-clay road.² Includes 1,190 feet which were surfaced with sand-clay.³ Includes about 2.25 miles of sand-clay roads.

TABLE 47.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Earth.	Gravel.	Macadam.		Earth.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Barry.....		300		Johnson.....			2,000
Benton.....		825		Lawrence.....	150	350	
Boone.....		2,000	5,000	Lincoln.....		1,800	2,250
Buchanan.....			6,700	Madison.....		600	
Callaway.....	1,000			Marion.....		1,000	
Camden.....	250			Moniteau.....		900	
Cape Girardeau.....	1,000	2,500		Monroe.....		1,200	
Cass.....		4,250		Osage.....			1,000
Cole.....	1,675	2,600		Pemiscot.....		3,168	
Cooper.....		3,250		Perry.....			1,200
Davies.....		3,500		Pettis.....		1,750	4,500
Franklin.....		3,000		Pike.....			2,500
Gasconade.....	650	1,100		St. Charles.....		350	15,600
Greene.....	1,000	2,000		St. Francois.....			25,000
Hickory.....	500			St. Louis.....			5,000
Jackson.....			5,000	Webster.....		600	
Jasper.....	400	980					
Jefferson.....		600	3,200	Average.....	275	1,023	3,383

¹Telford macadam roads in St. Charles County cost \$5,000 per mile. ²This is a gravel-macadam road.

MONTANA.

TABLE 48.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Beaverhead.....	700				
Broadwater.....	500				
Carbon.....	1,200				
Cascade.....	1,250				
Chouteau.....	1,556				
Custer.....	1,100				
Dawson.....	425		10	10	2.35
Deer Lodge.....	200		14	14	7.00
Fergus.....	2,000		4.5	4.5	.22
Flathead.....	1,000				
Gallatin.....	2,000	0.5		.5	.02
Granite.....	300				
Jefferson.....	235				
Lewis and Clark.....	1,150		20	20	1.73
Lincoln.....	500				
Madison.....	2,000		25	25	1.25
Meagher.....	415				
Missoula.....	700		10	10	1.42
Park.....	500				
Powell.....	600				
Ravalli.....	276		10	10	3.62
Rosebud.....	1,000		1	1	.10
Sanders.....	400				
Silver Bow.....	125				
Sweet Grass.....	400				
Teton.....	617				
Valley.....	1,500				
Yellowstone.....	670				
Total.....	23,319	.5	94.5	95	.41

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	22,419		65	65	0.28
1909.....	23,319	0.5	94.5	95	.41
Gain.....	900	.5	29.5	30	.13

¹Musselshell County established from parts of Fergus, Meagher, and Yellowstone Counties, 1911.

TABLE 49.—*Cost data, 1909.*

County.	Average cost per mile.		
	Earth.	Sand-clay.	Gravel.
Beaverhead.....	<i>Dollars.</i> 1 0.21	<i>Dollars.</i>	<i>Dollars.</i> 1 0.62
Dawson.....	300.00		800.00
Fergus.....			1.52
Rosebud.....		1 0.23	
Average.....	300.00		800.00

¹ Per square yard.

NEBRASKA.

TABLE 50.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adams.....	1 1,152					
Antelope.....	900					
Banner.....	1 1,400					
Blaine.....	2 20					
Boone.....	1 1,000					
Box Butte.....	1 1,160					
Boyd.....	730					
Brown.....	140					
Buffalo.....	1 1,728			1	1	0.05
Burt.....	775					
Butler.....	1 1,000					
Cass.....	1 1,200					
Cedar.....	1 1,215		0.5	130	130.5	10.74
Chase.....	500	10			10	2.00
Cherry.....	311					
Cheyenne.....	1,000					
Clay.....	1 1,152					
Colfax.....	1 850					
Cuming.....	1 979					
Custer.....	2,540					
Dakota.....	712					
Dawes.....	1 1,300					
Dawson.....	1 1,400					
Deuel.....	343	(2)	(2)	(2)	(2)	(2)
Dixon.....	1 1,000					
Dodge.....	1 1,000			.25	.25	.03
Douglas.....	575	41			4 56.8	9.83
Dundy.....	612					
Fillmore.....	1 1,152					
Franklin.....	1 950			10	10	1.06
Frontier.....	1 1,075					
Furnas.....	1 1,190					
Gage.....	1 1,528					
Garfield.....	653			1	1	.15
Gosper.....	1 800					
Grant.....	1					
Greeley.....	1,200					
Hall.....	1 1,152					
Hamilton.....	1 1,080					
Harlan.....	1 900					
Hayes.....	600					
Hitchcock.....	1 867					
Holt.....	1,198					
Hooker.....	2 30					
Howard.....	700					
Jefferson.....	1 1,040	(3)	(3)	(3)	(3)	(3)
Johnson.....	756					
Kearney.....	1 1,075			3	3	.29

¹ These figures include a considerable mileage of section lines which have not yet been opened up for use as roads.

² This county is but sparsely settled.

³ No report was received for this county.

TABLE 50.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-day.	Total.	
Keith.....	440					
Keyapaha.....	252					
Kimball.....	104					
Knox.....	1 1,495					
Lancaster.....	2,000					
Lincoln.....	15,000					
Logan.....	312					
Loup.....	100					
McPherson.....	(2)					
Madison.....	1 900			6	6	0.66
Merrick.....	1 900					
Nance.....	1 600					
Nemaha.....	870	1.5			1.5	.17
Nuckolls.....	1 1,152					
Otoe.....	1,200					
Pawnee.....	792					
Perkins.....	485					
Phelps.....	540			4	4	.74
Pierce.....	1 1,152					
Platte.....	1 972					
Polk.....	400					
Redwillow.....	1 1,000					
Richardson.....	995					
Rock.....	260					
Saline.....	1 1,150					
Sarpy.....	336					
Saunders.....	1 1,680					
Scotts Bluff.....	400					
Seward.....	1 1,000					
Sheridan.....	779					
Sherman.....	707					
Sioux.....	375					
Stanton.....	621			4.5	4.5	.72
Thayer.....	1 900					
Thomas.....	200					
Thurston.....	590					
Valley.....	1 800					
Washington.....	615					
Wayne.....	1 934					
Webster.....	1 1,100					
Wheeler.....	432			20	20	4.62
York.....	1 1,152					
Total ³	80,338	52.5	.5	179.75	4 248.55	.31

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	79,462	17		6	23	0.03
1909.....	80,338	52.5	0.5	179.75	4 248.55	.31
Gain.....	876	35.5	.5	173.75	225.55	.28

¹ These figures include a considerable mileage of section lines which have not yet been opened up for use as roads.

² This county is but sparsely settled.

³ Garden County established from Deuel County in 1910; Morrill County established from Cheyenne County in 1909 after this investigation was completed.

⁴ Includes 1 mile of brick road, 1.5 miles of concrete roads, and 13.3 miles of bituminous-macadam roads.

TABLE 51.—*Cost data, 1909.*

County.	Average cost per mile.		
	Sand-clay.	Macadam.	Bituminous.
	Dollars.	Dollars.	Dollars.
Boyd.....	1,000		
Buffalo.....	1,600		
Douglas.....			8,443
Madison.....	200		
Nemaha.....		6,000	
Average.....	933	6,000	8,443

NEVADA.

TABLE 52.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Churchill.....	350				
Douglas.....	150		3	3	2.00
Elko.....	2,000				
Esmeralda.....	1,000				
Eureka.....	400				
Humboldt.....	1,300				
Lander.....	2,000				
Lincoln.....	2,000				
Lyon.....	² 1,000				
Nye.....	1,000	1	(²)	1	.10
Ormsby.....	101		12	12	11.83
Storey.....	250		20	20	8.00
Washoe.....	600		10	10	1.66
White Pine.....	600				
Total.....	12,751	1	45	46	.36

RECAPITULATION.

(Year.)	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	12,585	4	60	64	0.51
1909.....	12,751	1	45	46	.36
Gain.....	166				

¹ Clark County established from part of Lincoln County in 1909, after this investigation was completed; Mineral County established from part of Esmeralda County, February, 1911.

² Many of the roads in the county pass over soils composed of natural gravel or sand and clay mixtures. Two hundred and fifty miles of natural gravel roads and 450 miles of sand-clay roads were reported for this county.

³ The soil in all parts of the county is largely gravel. The roads are naturally good.

NEW HAMPSHIRE.

TABLE 53.—Mileage of public roads, 1909.

County.	Total mileage of all roads improved.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Belknap.....	792	1 10	1 80	90	11.36
Carroll.....	1,090	42.6	1 105	147.6	13.54
Cheshire.....	1,513	1 20	1 120	140	9.25
Coos.....	941	1 5	1 95	100	10.62
Grafton.....	2,271	23.25	1 125	148.25	6.52
Hillsboro.....	2,463	31	1 260	291	11.81
Merrimack.....	2,301	19.75	1 130	149.75	6.50
Rockingham.....	1,674	23.6	201.96	225.56	13.47
Strafford.....	934	21.62	44.7	66.32	7.10
Sullivan.....	1,137	1 5	85	90	7.91
Total.....	15,116	201.82	1,246.66	1,448.48	9.58

RECAPITULATION.

Year.	Total mileage of all roads improved.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	15,116	113	1,175	1,293	8.55
1909.....	15,116	201.82	1,246.66	1,448.48	9.58
Gain.....		83.82	71.66	155.48	1.03

¹ These figures were reported for 1904. It was impossible to secure complete information for 1909.

TABLE 54.—Cost data, 1909.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Belknap County:	<i>Dollars.</i>	<i>Dollars.</i>	Merrimack County—Contd.	<i>Dollars.</i>	<i>Dollars.</i>
Tilton.....		5,000.00	New London.....	1,200.00	
Carroll County.....		4,300.00	Northfield.....	2,600.00	3,300.00
Cheshire County.....	3,300.00	6,500.00	Pembroke.....		5,300.00
Grafton County:			Warner.....	1 75	1 1.10
Ashland.....	1 30		Wilmot.....	1,400.00	
Bethlehem.....		7,700.00	Rockingham County:		
Bridgewater.....	1,876.00		Atkinson.....		4,000.00
Canaan.....	2,000.00	6,000.00	Brentwood.....	2,000.00	
Enfield.....	4,000.00		Chester.....		5,800.00
Hanover.....	2,640.00	4,700.00	Danville.....	2,600.00	
Haverhill.....	2,500.00	5,000.00	Deerfield.....	1 90	
Holderness.....	2,500.00	7,000.00	Derry.....		² 5,300.00
Lyme.....	2,500.00		Exeter.....		1 1.25
Monroe.....	1,200.00		Hampstead.....	1,200.00	2,000.00
Warren.....	1,000.00		Hampton.....	1,500.00	
Hillsboro County:			Hampton Falls.....	4,300.00	
Amherst.....	2,500.00		Kingston.....	3,000.00	
Deering.....	2,450.00		Newington.....	2,500.00	
East Weare.....		2,400.00	Newmarket.....	1 20	5,000.00
Goffstown.....	2,250.00	7,000.00	Newton.....	3,000.00	
Greenville.....		2,500.00	North Hampton.....	1 38	
Hollis.....	4,000.00		Northwood.....	1 75	
Hudson.....	1,000.00	7,000.00	Nottingham.....	3,800.00	
Mason.....	800.00		Plaistow.....	1,500.00	
Merrimack.....	3,300.00	6,800.00	Salem.....		5,000.00
Milford.....		1 57	Windham.....	4,200.00	5,300.00
New Ipswich.....	900.00	6,800.00	Strafford County:		
Peterboro.....	1,200.00	5,200.00	Madbury.....	2,200.00	
Merrimack County:			Middleton.....	2,400.00	
Boscawen.....	4,500.00	5,500.00	Milton.....		4,500.00
Bow.....	1,000.00	3,200.00	New Durham.....	4,000.00	
Bradford.....		2,200.00	Rochester.....	2,100.00	4,200.00
Chichester.....	2,600.00		Rollinsford.....	1 90	
Dunbarton.....	500.00		Somersworth.....		6,000.00
Epsom.....	3,000.00		Average.....	2,352.00	5,016.00
Hopkinton.....	2,100.00	5,000.00			

¹ Per square yard.

² $1\frac{1}{4}$ miles with paved gutters and curbing cost \$22,700.

NEW JERSEY.

TABLE 55.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Bituminous-macadam.	Macadam.	Gravel.	Total.	
Atlantic.....	688	0.6	5	112	117.6	17.09
Bergen.....	753	20	350	370	750	49.13
Burlington.....	1,334	18	193	48	259	19.41
Camden.....	515	11.25	104.32	64	179.57	34.86
Cape May.....	380	9	9	55.33	73.33	19.29
Cumberland.....	691	.....	.....	6.52	6.52	.94
Essex.....	697	7	665	.....	672	96.41
Gloucester.....	629	9.6	33.4	43.24	86.24	13.71
Hudson.....	363	4	30	.....	34	9.36
Hunterdon.....	777	6.75	33.5	.....	40.25	5.18
Mercer.....	453	17.52	142.69	.....	160.21	35.36
Middlesex.....	788	50	225	30	305	38.70
Monmouth.....	1,058	.....	65	125	190	17.95
Morris.....	976	9.52	152.92	.....	162.44	16.64
Ocean.....	821	.....	.....	68	68	8.28
Passaic.....	500	7.56	222	.....	229.56	45.91
Salem.....	697	2.2	7.18	12.88	22.26	3.19
Somerset.....	612	4.48	95.58	.....	100.06	16.34
Sussex.....	805	3.25	26.75	.....	30	3.72
Union.....	567	22	178	7	207	36.50
Warren.....	738	8.6	55.75	.47	64.82	8.78
Total.....	14,842	211.33	2,594.09	572.44	3,377.86	22.76

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Bituminous-macadam.	Macadam.	Gravel.	Total.	
1904.....	14,842	.....	1,901.05	481.47	2,422.30	16.32
1909.....	14,842	211.33	2,594.09	572.44	3,377.86	22.76
Gain.....	.....	211.33	693.04	90.97	955.56	6.44

¹ Includes 39.78 miles of roads surfaced with shells.TABLE 56.—*Cost data, 1909.*

County.	Road.	Cost per mile.		
		Gravel.	Macadam.	Bituminous-macadam.
		Dollars.	Dollars.	Dollars.
Atlantic.....	English Creek.....	2,241	.....	.....
Bergen.....	Valley.....	.....	4,923	.....
Do.....	Yesler Way, etc.....	.....	7,113	.....
Camden.....	Camden and Blackwood Turnpike.....	.....	.....	12,101
Do.....	Evesham.....	.....	19,320	.....
Cape May.....	Schellenger's Landing.....	5,561	.....	.....
Do.....	Goshen.....	4,363	.....	.....
Do.....	Tuekahoo.....	5,761	.....	.....
Do.....	Rio Grande.....	5,849	.....	.....
Hunterdon.....	Whitehouse and Flemington.....	.....	27,326	.....
Mercer.....	Hopewell and Stoutsburg.....	.....	7,287	.....
Middlesex.....	Jamesburg and Helmetta.....	.....	.....	8,168
Do.....	Trenton Turnpike.....	.....	.....	9,803
Do.....	Spotswood and Helmetta.....	.....	.....	7,916
Do.....	Plainsboro and Cranbury.....	.....	.....	8,779
Do.....	Cranbury and South River Turnpike.....	2,403	.....	.....
Monmouth.....	Allentown and Imlaystown.....	3,911	.....	.....
Do.....	Lakewood and Adelpia.....	3,773	.....	.....
Ocean.....	Lakewood and Alligator.....	5,261	.....	.....
Salem.....	Barnesboro Turnpike.....	3,939	.....	.....
Do.....	Penn's Grove and Daneer's Mill.....	.....	8,807	.....
Do.....	Alloway and Aldine.....	4,432	.....	.....
Somerset.....	Stoutsburg and Blawenburg.....	.....	9,630	.....
Do.....	Washington Valley.....	.....	13,406	.....
Sussex.....	Frankford and Sandyston.....	.....	10,071	.....
Union.....	Edgar.....	.....	.....	12,817
Warren.....	Morris Turnpike.....	.....	9,581	.....
Average.....	.....	4,317	8,746	9,930

¹ 1,200 feet of second course treated with amiesite.² Grades reduced from 14 to 6 per cent.

NEW MEXICO.

TABLE 57.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Bernalillo.....	140					
Chaves.....	2,998					
Colfax.....	430					
Curry.....	500					
Dona Ana.....	562					
Eddy.....	475					
Grant.....	594					
Guadalupe.....	1,000					
Lincoln.....	400					
Luna.....	432		2	1	3	0.69
McKinley.....	550					
Mora.....	500					
Otero.....	500	25	6	20	51	10.20
Quay.....	300					
Rio Arriba.....	530			50	50	9.43
Roosevelt.....	500					
San Juan.....	160					
San Miguel.....	1,000					
Sandoval.....	500					
Santa Fe.....	105					
Sierra.....	494					
Socorro.....	2,500					
Taos.....	300					
Torrance.....	400					
Union.....	350					
Valencia.....	700					
Total.....	16,920	25	8	71	104	.61

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	15,326		2		2	0.01
1909.....	16,920	25	8	71	104	.61
Gain.....	1,594	25	6	71	102	.60

NEW YORK.

TABLE 58.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Macadam.		Gravel, by town.	Total.	
		By State and county.	By town.			
Albany.....	1,098	101.6	34.81	18.4	154.81	14.10
Allegany.....	1,894		5.2	75.99	81.19	4.29
Broome.....	1,437	58.62	.09	9.49	68.2	4.75
Cattaraugus.....	1,983	16.19	1.5	100.63	118.32	5.97
Cayuga.....	1,485	45.14	15.9	225.8	286.84	19.32
Chautauqua.....	1,949	1.05		84.52	85.57	4.39
Chemung.....	869	31.43		3.73	35.16	4.04
Chemango.....	1,746	50.35	5.7	17.86	73.91	4.23
Clinton.....	1,377	59.9	1.2	109	170.1	12.35

¹ Kings, New York, Queens, and Richmond Counties have no rural roads; they are included in the city of New York.

TABLE 58.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Macadam.		Gravel, by town.	Total.	
		By State and county.	By town.			
Columbia.....	1,379	27.81	.85	134.17	162.83	11.80
Cortland.....	1,037	35.79	6	12.25	54.04	5.21
Delaware.....	2,358	15.39	11.9	44.1	71.39	3.02
Dutchess.....	1,617	69.54	36	692.42	797.96	49.34
Erie.....	1,900	162.17	91.92	179.66	433.75	22.82
Essex.....	1,306	22.84	6.5	146.13	175.47	13.43
Franklin.....	1,367	14.92	29.95	80.5	125.37	9.17
Fulton.....	769	41.27	3	104.4	148.67	19.33
Genesee.....	920	5.58	106.9	557.6	670.08	72.83
Greene.....	1,059	15.78	37.66	79.75	133.19	12.57
Hamilton.....	444	3.44	1.25	264.98	269.67	60.75
Herkimer.....	1,406	60.9	16.92	58.36	136.18	9.68
Jefferson.....	2,204	69.52	179.21	220.45	469.18	21.24
Lewis.....	1,445	.....	62.69	45.03	107.72	7.45
Livingston.....	1,285	19.79	7.85	81.25	108.89	8.47
Madison.....	1,423	14.58	80.55	110.83	205.96	14.47
Monroe.....	1,368	158.45	263.19	440.15	861.79	62.99
Montgomery.....	849	51.29	4.4	22.8	78.49	9.24
Nassau.....	1,491	34.54	172.3	106.67	313.51	21.02
Niagara.....	934	30.6	35.7	67.73	134.03	14.35
Onondaga.....	2,317	93.24	62.76	225.43	381.43	16.46
Ontario.....	1,635	55.42	117.61	208.21	381.24	23.31
Orange.....	1,312	68.33	59.6	277.28	405.21	30.88
Orleans.....	1,595	151.68	62.93	501.5	716.11	44.89
Oswego.....	720	29.22	128.25	184	341.47	47.42
Otsego.....	1,714	28.84	50.5	87.75	167.09	9.74
Putnam.....	2,153	50.03	3.3	30.25	83.58	3.88
Rensselaer.....	509	15.17	2	67.75	84.92	16.68
Rockland.....	1,291	88.54	.75	195.8	285.09	22.08
St. Lawrence.....	371	20.43	47.27	123.79	191.49	51.61
Saratoga.....	3,099	30.55	224.92	371.27	626.74	20.22
Schenectady.....	1,521	55.05	2.5	153.98	211.53	13.90
Schoharie.....	412	33.89	9	47	89.89	21.81
Schuyler.....	1,259	.....	19.9	10.65	30.55	2.42
Seneca.....	762	.....	.....	15.75	15.75	2.06
Stauben.....	704	11.33	2.5	52	65.83	9.35
Steuben.....	3,094	5.79	.5	52.3	58.59	1.89
Suffolk.....	1,953	25.73	21.87	449.67	497.27	25.46
Sullivan.....	1,816	17.92	17.41	171.2	206.53	11.37
Tioga.....	1,067	.....	8.5	22.8	31.3	2.93
Tompkins.....	1,091	30.87	5.3	9.1	45.27	4.14
Ulster.....	1,848	96.16	37.6	323.35	457.11	24.73
Warren.....	1,010	38.23	.7	32	70.93	7.02
Washington.....	1,533	22.29	12.4	208.58	243.27	15.86
Wayne.....	1,348	.....	67.92	170.14	238.06	17.66
Westchester.....	908	119.81	121.52	58.22	299.55	32.99
Wyoming.....	1,069	.....	.....	24.66	24.66	2.30
Yates.....	769	.....	.75	3.88	4.63	.60
Total.....	79,279	2,307	2,307.40	8,172.96	12,787.36	16.13

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Macadam.		Gravel, by town.	Total.	
		By State and county.	By town.			
1904.....	73,798	707	1,477	3,692	5,876	7.96
1909.....	79,279	2,307	2,307.4	8,172.96	12,787.36	16.13
Gain.....	5,481	1,600	830.4	4,480.96	6,911.36	8.17

TABLE 59.—Cost data, 1909.

County.	Average cost per mile.				
	Macadam.				Gravel.
	Limestone.	Trap-rock.	Fieldstone.	Miscellaneous.	
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Albany.....	9,278	9,151		¹ 9,232	
Broome.....	9,643	10,034	9,893		
Cattaraugus.....	10,793				
Cayuga.....	8,822			² 13,445	
Chautauqua.....	10,153				
Chemung.....		10,158			
Chenango.....	10,567	12,996		¹ 11,338	
Clinton.....	6,706			² 6,451	
Columbia.....		11,136		¹ 8,820	
Cortland.....	7,593	11,847		¹ 6,756	6,505
Delaware.....		15,216		¹ 8,211	
Dutchess.....				⁴ 7,067	
Erie.....	10,347	9,814	9,224	¹ 9,478	6,240
Essex.....		9,226	10,614	² 9,854	
Franklin.....				¹ 9,469	
Fulton.....		11,161	9,905	⁵ 9,612	
Genesee.....	7,627			¹ 9,741	
Greene.....				¹ 8,735	
Herkimer.....		9,993		⁶ 8,796	
Jefferson.....	7,570		8,010	⁵ 9,364	
Livingston.....	11,211			⁶ 11,459	
Madison.....	8,487			⁶ 13,036	
Monroe.....	9,128	9,240	8,342	⁷ 7,038	
Montgomery.....	8,625	8,935	9,392	⁶ 9,233	
Nassau.....		10,521		⁵ 10,297	
Niagara.....	8,577			² 11,055	
Oncida.....	9,352	8,074		⁶ 7,322	
Onondaga.....	10,283	10,854		⁶ 7,123	
Ontario.....	8,396		8,110	⁶ 8,031	
Orange.....	10,346		4,396	² 10,156	
Orleans.....	6,600		6,429	⁷ 12,616	5,071
Oswego.....	10,763	11,552		³ 8,438	
Otsego.....	10,410	9,614		⁵ 7,736	
Putnam.....				⁶ 10,206	
Rensselaer.....	9,234	9,456	9,081	⁸ 4,795	
Rockland.....		9,066		⁶ 7,123	
Saratoga.....		8,557		¹ 8,306	7,570
Schenectady.....	9,698	10,020		² 12,292	
Seneca.....	8,823			⁶ 9,849	
Steuben.....	12,170			⁶ 11,029	
Suffolk.....		9,479		⁴ 9,298	4,366
Sullivan.....				⁶ 8,797	
Tompkins.....	10,623			⁶ 7,649	
Ulster.....		10,362		⁶ 24,518	
Warren.....		10,244		⁵ 5,711	
Washington.....	9,919	8,495		⁶ 7,499	
Westchester.....		9,735	7,739	⁶ 7,845	
Average.....	9,370	10,183	8,428	⁶ 13,270	

¹ Local sandstone.² Syenite.³ Local bluestone.⁴ Quartz.⁵ Granite.⁶ Local stone.⁷ Gneiss.⁸ Local shale.

NORTH CAROLINA.

TABLE 60.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Alamance.....	540	55		10	65	12.03
Alexander.....	500					
Alleghany.....	260					
Anson.....	500	28	2		10	2.00
Ashe.....	600					
Beaufort.....	350					
Bertie.....	700			35	35	5.00
Bladen.....	500					
Brunswick.....	800			11	11	1.37
Buncombe.....	700	65		1	66	9.42
Burke.....	500					
Cabarrus.....	332	30	30		60	18.07
Caldwell.....	600	4	40		44	7.33
Camden.....	200					
Carteret.....	500					
Caswell.....	400	16			16	4.00
Catawba.....	400					
Chatham.....	700		5	3	8	1.14
Cherokee.....	400	10			10	2.50
Chowan.....	150					
Clay.....	150					
Cleveland.....	650		5		5	.76
Columbus.....	900			12	12	1.33
Craven.....	600	1		25	26	4.33
Cumberland.....	500			40	40	8.00
Currituck.....	140					
Dare.....	500					
Davidson.....	500	2			2	.40
Davie.....	350					
Duplin.....	800					
Durham.....	550	102			102	18.54
Edgecombe.....	650			10	10	1.53
Forsyth.....	400	46			46	11.50
Franklin.....	550		80		80	14.54
Gaston.....	300	68			68	22.66
Gates.....	350					
Graham.....	200					
Granville.....	650	3	20	75	98	15.07
Greene.....	300					
Guilford.....	700	102	14		116	16.57
Halifax.....	700		10	50	60	8.57
Harnett.....	700			25	25	3.57
Haywood.....	300	28	4		32	10.66
Henderson.....	500					
Hertford.....	400		15		15	3.75
Hyde.....	225			2.5	2.5	1.11
Iredell.....	500	26			26	5.20
Jackson.....	340					
Johnston.....	800		44	10	54	6.75
Jones.....	400					
Lee.....	300					
Lenoir.....	500					
Lincoln.....	450					
McDowell.....	350	26			26	7.42
Macon.....	750					
Madison.....	300					
Martin.....	400					
Mecklenburg.....	850	233			233	27.41
Mitchell.....	400					
Montgomery.....	500					
Moore.....	700			25	25	3.57
Nash.....	600	4	5	25	34	5.66
New Hanover.....	200	50			50	25.00
Northampton.....	600		20		20	3.33
Onslow.....	588					
Orange.....	300	10	10		20	6.66
Pamlico.....	280					
Pasquotank.....	250					
Pender.....	1,000					
Perquimans.....	325					
Person.....	400					

¹ Avery County established from parts of Caldwell, Mitchell, and Watauga Counties, February, 1911; Hoke County established from parts of Cumberland and Robeson Counties, April, 1911.

² Poor.

³ Report for 1904 evidently includes natural gravel roads instead of those which have been surfaced with gravel.

TABLE 60.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Pitt.....	700			2	2	.28
Polk.....	200	3.5			3.5	1.75
Randolph.....	500	4			4	.80
Richmond.....	300		6	115	121	40.33
Robeson.....	1,000			50	50	5.00
Rockingham.....	700	9			9	1.28
Rowan.....	300	63		26	89	29.66
Rutherford.....	550					
Sampson.....	700			50	50	7.14
Scotland.....	340			55	55	16.17
Stanly.....	500					
Stokes.....	500					
Surry.....	500					
Swain.....	450					
Transylvania.....	350					
Tyrrell.....	300					
Union.....	600		40		40	6.66
Vance.....	200		5	40	45	22.50
Wake.....	1,560	40	140		180	11.53
Warren.....	400		40		40	10.00
Washington.....	300			2	2	.66
Watauga.....	325		10		10	3.07
Wayne.....	600			30	30	5.00
Wilkes.....	800					
Wilson.....	530	30			30	5.66
Yadkin.....	500					
Yancey.....	300					
Total.....	48,285	1,038.5	545	729.5	2,313	4.79

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	49,763	399	422	438	1,259	2.53
1909.....	48,285	1,038.5	545	729.5	2,313	4.79
Gain.....		639.5	123	291.5	1,054	2.26

TABLE 61.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Sand-clay.	Gravel.	Macadam.		Sand-clay.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Alamance.....			4,500	Tredell.....			3,000
Anson.....		1,500		Johnston.....		1,200	
Bertie.....	500			McDowell.....			3,000
Buncombe.....			4,000	Mecklenburg.....			4,000
Caldwell.....		1,000		Nash.....	375		
Cherokee.....			3,000	New Hanover.....			3,600
Columbus.....	450			Orange.....			5,000
Craven.....	1,000			Richmond.....	500	500	
Cumberland.....	300			Robeson.....	375		
Duplin.....	450			Rockingham.....			3,750
Durham.....			(¹)	Rowan.....	350		3,200
Edgecombe.....	500			Scotland.....	325		
Forsyth.....			6,000	Wake.....		400	5,000
Franklin.....		650		Warren.....		300	
Gaston.....			4,750	Wilson.....			4,000
Gulford.....		2,500	3,500				
Harnett.....	1,200			Average.....	506	1,006	4,020
Hyde.....	250						

¹ If built by convict labor, these roads cost \$5,000; if built by contract, they cost \$6,000.

NORTH DAKOTA.

TABLE 62.—Mileage of public roads, 1909.

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Adams.....	365				
Barnes.....	3,050		10	10	0.32
Benson.....	1,000		5	5	.50
Billings.....	1,000		8	8	.80
Bottineau.....	3,400		5	5	.14
Bowman.....	(²)				
Burleigh.....	525		2	2	.38
Cass.....	3,450				
Cavalier.....	3,000		3	3	.10
Dickey.....	1,064		2	2	.18
Dunn.....	(²)				
Eddy.....	350		2	2	.57
Emmons.....	463				
Foster.....	1,296		2	2	.15
Grand Forks.....	2,000		10	10	.50
Griggs.....	1,100		5	5	.45
Hettinger.....	(²)				
Kidder.....	28				
Lamoure.....	2,340		3	3	.12
Logan.....	895				
McHenry.....	1,500		5	5	.33
McIntosh.....	1,000		3	3	.30
McKenzie.....	(²)				
McLean.....	2,916		5	5	.17
Mercer.....	160				
Morton.....	1,500		10	10	.66
Mountrail.....	800				
Nelson.....	1,750		5	5	.28
Oliver.....	149				
Pembina.....	2,600				
Pierce.....	1,440				
Ramsey.....	1,637		12	12	.73
Ransom.....	864				
Richland.....	2,183				
Rolette.....	1,500		5	5	.33
Sargent.....	810				
Sheridan.....	100				
Stark.....	202		5	5	2.47
Steele.....	1,440		3	3	.29
Stutsman.....	2,400				
Towner.....	2,088		5	5	.23
Trall.....	1,593		5	5	.31
Walsh.....	2,600		5	5	.19
Ward.....	2,160		10	10	.46
Wells.....	2,520		5	5	.19
Williams.....	350				
Total.....	61,593		140	140	.23

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	59,332	7	205	212	0.36
1909.....	61,593		140	140	.23
Gain.....	2,261				

¹ Burke County established from part of Ward County, August, 1910; Divide County established from part of Williams County, December, 1910; and Renville County established from part of Ward County, August, 1910.

² This county was recently organized and is but sparsely settled.

OHIO.

TABLE 63.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Brick.	Stone.	Gravel.	Total.	
Adams.....	1,000		309		309	30.90
Allen.....	914	1	519		520	56.99
Ashland.....	1,013		17	1	18	1.77
Ashtabula.....	1,261	2	34		36	2.85
Athens.....	1,172	3	107	18	128	10.92
Auglaize.....	850		15	369	384	45.18
Belmont.....	1,320	4	121		125	9.47
Brown.....	978		306		306	31.30
Butler.....	933	1	82	788	871	93.35
Carroll.....	1,005					
Champaign.....	802			462	462	57.60
Clark.....	862		69	793	862	100.00
Clermont.....	1,036		435		435	40.05
Clinton.....	835		52	627	679	81.32
Columbiana.....	1,338	10	1	7	18	1.35
Coshocton.....	1,268	3	5	66	74	5.80
Crawford.....	868		273	17	290	33.40
Cuyahoga.....	924	135	12	6	153	16.56
Darke.....	1,257		16	744	760	60.46
Defiance.....	935		30	429	459	49.10
Delaware.....	893		332	141	473	52.96
Erie.....	505		258	24	282	55.84
Fairfield.....	1,060		44	163	207	19.53
Fayette.....	688			298	298	43.30
Franklin.....	1,060	1	264	240	505	47.64
Fulton.....	921		53	337	390	42.34
Gallia.....	1,056			159	159	15.05
Geauga.....	805		6	7	13	1.60
Greene.....	813		40	632	672	82.66
Guernsey.....	1,280		30		30	2.34
Hamilton.....	936		324		324	34.61
Hancock.....	1,220		378	5	383	31.40
Hardin.....	939		230	201	431	45.90
Harrison.....	940		52		52	5.53
Henry.....	971		225	162	387	39.85
Highland.....	1,138		327	70	397	34.95
Hocking.....	910		20	22	42	4.62
Holmes.....	1,023	1	5	25	31	3.03
Huron.....	943		105	20	125	13.25
Jackson.....	864		162		162	18.75
Jefferson.....	888	5	147		152	17.11
Knox.....	1,408					2.15
Lake.....	458	1	4	258	263	57.42
Lawrence.....	951		152	27	179	18.82
Licking.....	1,417		54	259	312	22.02
Logan.....	888		13	472	485	54.60
Lorain.....	1,007		100	17	117	11.60
Lucas.....	769	1	120		121	15.73
Madison.....	612			546	546	89.20
Mahoning.....	917	12	50		62	6.76
Marion.....	843		195	120	315	37.37
Medina.....	858	4	61	45	110	12.82
Meigs.....	1,000	5	2	6	13	1.30
Mercer.....	1,085		102	396	498	45.90
Miami.....	910		4	675	679	74.60
Monroe.....	1,264					
Montgomery.....	1,054		60	933	998	93.80
Morgan.....	1,072		68		68	6.34
Morrow.....	898		60		60	6.68
Muskingum.....	1,482	4	36	57	97	6.54
Noble.....	943	1	23		24	2.54
Ottawa.....	614		55		55	8.96
Paulding.....	1,013		336	19	355	35.04
Perry.....	975		53	4	57	5.84
Pickaway.....	794			196	196	24.70
Pike.....	640			124	124	19.40
Portage.....	1,000		9	5	14	1.40
Preble.....	931		44	585	629	67.56
Putnam.....	1,180		389	81	470	39.83
Richland.....	1,344		81		81	6.03
Ross.....	1,092			537	537	35.44
Sandusky.....	980		348	30	378	38.57
Scioto.....	628		154	57	211	33.60
Seneca.....	1,260		131	8	139	11.03
Shelby.....	921			420	420	45.60
Stark.....	1,375	2	5	5	12	.87

TABLE 63.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Brick.	Stone.	Gravel.	Total.	
Summit.....	1,050	23	7	.....	30	2.86
Trumbull.....	1,171	1	117	.....	118	10.08
Tuscarawas.....	1,617	4	6	.....	10	.62
Union.....	920	.....	63	642	705	76.63
Van Wert.....	1,013	.....	657	9	666	65.74
Vinton.....	879	.....	.....	.....	.....	.....
Warren.....	824	.....	.....	659	659	80.00
Washington.....	1,521	4	.....	20	24	1.58
Wayne.....	1,396	3	2	1	6	.43
Williams.....	953	.....	29	180	209	21.93
Wood.....	1,494	.....	525	.....	525	35.14
Wyandot.....	956	.....	165	108	273	28.55
Total.....	88,861	231	9,687	14,188	24,106	27.13

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Brick.	Stone.	Gravel.	Total.	
1904.....	69,439	93.25	7,160.5	16,159	123,460	33.79
1909.....	88,861	231	9,687	14,188	24,106	27.13
Gain.....	19,422	137.75	2,526.5	.....	646	.....

¹ Includes 13.25 miles of bituminous-macadam roads, 31 miles of gravel-macadam roads, and 3 miles of asphalt roads.

TABLE 64.—*Cost data, 1909.*

County and township.	Average cost per mile.			
	Gravel.	Macadam.	Bituminous.	Brick.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Allen.....	1 0.65	1 1.20	.....	.....
Ashland.....	.....	4,250.00	.....	.....
Ashtabula.....	.....	6,000.00	8,000.00	.....
Athens.....	2,500.00	3,500.00	.....	12,000.00
Belmont.....	.....	8,000.00	.....	12,000.00
Brown.....	.....	3,500.00	.....	.....
Champaign.....	1,800.00	.....	.....	.....
Clermont.....	.....	3,500.00	.....	.....
Clinton.....	3,400.00	4,000.00	.....	.....
Crawford.....	.....	2,650.00	.....	.....
Cuyahoga.....	.....	2,342.00	.....	.....
Darke.....	4,000.00	5,500.00	.....	.....
Gallia.....	2,500.00	4,000.00	.....	.....
Geauga.....	.....	6,200.00	.....	.....
Greene.....	1,900.00	3,850.00	.....	.....
Guernsey.....	.....	7,500.00	.....	.....
Hamilton.....	.....	² 8,000.00	.....	.....
Hancock.....	.....	3,000.00	.....	.....
Hardin.....	1,200.00	4,000.00	.....	.....
Harrison.....	.....	7,000.00	.....	.....
Hocking.....	.....	5,000.00	.....	.....
Holmes.....	.....	1.90	.....	.....
Huron.....	2,000.00	5,000.00	.....	.....
Jackson.....	.....	3,000.00	.....	.....
Knox.....	.....	7,000.00	.....	.....
Lake.....	.....	6,080.00	.....	.....
Lawrence.....	3,000.00	3,000.00	.....	.....
Licking.....	.....	5,000.00	.....	.....

¹ Per cubic yard.

² This is a bituminous-macadam road.

TABLE 64.—*Cost data, 1909—Continued.*

County and township.	Average cost per mile.			
	Gravel.	Macadam.	Bituminous.	Brick.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Logan.....	2,000.00	4,000.00		
Lorain.....		7,500.00		
Mahoning.....		9,000.00		14,500.00
Medina.....		4,500.00		
Meigs.....	2,000.00			
Montgomery.....	700.00	5,000.00		
Morgan.....		7,000.00		
Muskingum.....				10,786.00
Noble.....				12,500.00
Ottawa.....		5,000.00		
Paulding.....		3,000.00		
Portage.....		8,000.00	5,000.00	
Putnam.....		1.45		
Richland.....		3,200.00		
Seneca.....	750.00	2,533.00		
Seneca, townships:				
Adams.....	500.00	3,000.00		
Big Spring.....		2,500.00		
Bloom.....		2,000.00		
Clinton.....		2,800.00		
Eden.....		3,600.00		
Hopewell.....		3,050.00		
Loudon.....		3,000.00		
Reed.....		2,550.00		
Scipio.....		2,600.00		
Seneca.....		4,000.00		
Thompson.....		2.75		
Venice.....		2,250.00		
Summit.....		7,600.00	10,300.00	
Tuscarawas.....		2.80		2.90
Van Wert.....		2,200.00		
Wayne.....	1,800.00	7,000.00		12,500.00
Williams.....	500.00	4,500.00		
Wood.....		6,000.00		
Wyandot.....		4,500.00		
Average.....	1,909.00	4,580.00	7,766.00	12,381.00

¹ Per cubic yard.² Per square yard.

OKLAHOMA.

TABLE 65.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adair.....	500					
Alfalfa.....	800					
Atoka.....	900					
Beaver.....	900					
Beckham.....	900			6	6	0.66
Blaine.....	900	0.5		15	15.5	1.72
Bryan.....	925			30	30	3.24
Caddo.....	1,400					
Canadian.....	900			3	3	.33
Carter.....	800					
Cherokee.....	750					
Choctaw.....	400					
Cimarron.....	1,850					
Cleveland.....	566					
Coal.....	650					
Comanche.....	1,500	2	2		4	.26
Craig.....	750					
Creek.....	950					
Custer.....	1,718					

¹ Swanson County, after not quite a year's existence, was declared illegally formed by the State supreme court and was abolished in 1910. Its mileage is given here separate from other counties because it was in existence at the time of this investigation.

TABLE 46.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved lands.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Delaware.....	800					
Dewey.....	1,106					
Ellis.....	1,200					
Garfield.....	1,860					
Garvin.....	500					
Grady.....	809					
Grant.....	980			10	10	1.02
Greer.....	640			5	5	.78
Harmon.....	550					
Harper.....	1,000					
Haskell.....	600					
Hughes.....	850					
Jackson.....	775			25	25	3.22
Jefferson.....	750					
Johnston.....	650					
Kay.....	925					
Kingfisher.....	900					
Kiowa.....	764					
Latimer.....	735					
Le Flore.....	1,500					
Lincoln.....	1,000		33.5	6	39.5	3.95
Logan.....	725					
Love.....	500					
McClain.....	500			2	2	.40
McCurtain.....	1,500					
McIntosh.....	650					
Major.....	925			10	10	1.08
Marshall.....	415					
Mayes.....	675					
Murray.....	425					
Muskogee.....	800			25	25	3.12
Noble.....	864					
Nowata.....	600					
Okfuskee.....	625					
Oklahoma.....	800					
Oklmulgee.....	675					
Osage.....	2,200					
Ottawa.....	605		4		4	.79
Pawnee.....	600					
Payne.....	675					
Pittsburg.....	1,300	21	102		123	9.46
Pontotoc.....	1,000					
Pottawatomie.....	800					
Pushmataha.....	1,425			50	50	3.50
Roger Mills.....	1,296					
Rogers.....	725					
Seminole.....	630					
Sequoyah.....	700					
Stephens.....	900					
Swanson.....	650					
Texas.....	2,000			4	4	.20
Tillman.....	725					
Tulsa.....	975			5	5	.51
Wagoner.....	1,080					
Washington.....	500					
Washita.....	2,016					
Woods.....	1,500					
Woodward.....	1,500					
Total.....	71,325	23.5	141.5	196	361	.5

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	43,554					
1909.....	71,325	23.5	141.5	196	361	0.5
Gain.....	27,771	23.5	141.5	196	361	.5

TABLE 66.—*Cost data, 1909.*

County.	Average cost per mile.		County.	Average cost per mile.	
	Sand-clay.	Macadam.		Sand-clay.	Macadam.
	Dollars. ¹	Dollars.		Dollars.	Dollars.
Beckham.....	400		Lincoln.....		3,600
Blaine.....	800	4,500	Texas.....	600	
Bryan.....	72		Average.....	389	3,750
Grant.....	75				

OREGON.

TABLE 67.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Baker.....	1,000		5		5	0.50
Benton.....	745					
Clackamas.....	2,000	50	150		1,280	14.00
Clatsop.....	250	45	30		75	30.00
Columbia.....	425		150	5	150	35.29
Coos.....	442		30		285	19.23
Crook.....	750		10		10	1.33
Curry.....	150		16		16	10.66
Douglas.....	2,000	2	75		77	3.85
Gilliam.....	500					
Grant.....	500		1		1	.20
Harney.....	1,675		40	75	115	6.86
Hood River.....	500		15	13	33	6.60
Jackson.....	800	7	75	75	157	19.62
Josephine.....	300		10	2	12	4.00
Klamath.....	900	4	10		14	1.55
Lake.....	50		10	70	80	16.00
Lane.....	2,800	9	500		509	18.17
Lincoln.....	400					
Linn.....	1,500	10	200	100	310	20.66
Malheur.....	500					
Marion.....	1,500	50	30		80	5.33
Morrow.....	500					
Multnomah.....	450	115	115		230	51.11
Polk.....	1,000	14	110		124	12.40
Sherman.....	500					
Tillamook.....	300	3	120		123	41.00
Umatilla.....	1,215	1			1	.08
Union.....	653	1.25	18		19.25	2.94
Wallowa.....	1,800		15		15	.80
Wasco.....	1,000		10		12	1.20
Washington.....	750	40	20		60	8.00
Wheeler.....	300		6		6	2.00
Yamhill.....	750	100	100		200	26.66
Total.....	29,475	451.25	1,871	345	4,279.25	9.49

¹ Includes 80 miles of plank roads.

² Includes 50 miles of plank roads.

³ Includes 2 miles of bituminous-macadam roads.

⁴ Includes 130 miles of plank roads and 2 miles of bituminous-macadam roads.

TABLE 67.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	34,258	209	2,235	.....	¹ 2,589	7.56
1909.....	29,475	451.25	1,871	.....	² 2,799.25	9.49
Gain.....	.....	242.25	.....	.....	210.25	1.93

¹ Includes 145 miles of plank roads.² Includes 130 miles of plank roads and 2 miles of bituminous-macadam roads.TABLE 68.—*Cost data, 1909.*

County.	Average cost per mile.		County.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
Clackamas.....	<i>Dollars.</i> 600	<i>Dollars.</i> 2,000	Polk.....	<i>Dollars.</i> 2,640	3,520
Douglas.....	2,400	.....	Union.....	.....	3,000
Lane.....	.....	3,000	Washington.....	1,500	3,000
Linn.....	3,500	4,920	Average.....	1,940	3,491
Multnomah.....	1,000	5,000			

PENNSYLVANIA.

TABLE 69.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Total.	Approximate percentage of roads improved.
		State-aid roads.		Roads improved without State-aid.			
		Macadam.	Brick.	Macadam.	Gravel.		
Adams.....	1,065.96	7.3	.....	17.7	.....	25	2.34
Allegheny.....	1,673.31	10.5	.....	² 413.5	.....	² 424	25.33
Armstrong.....	1,723.14	12.1	2.2	.....	2	16.3	.94
Beaver.....	1,109.21	10	.....	.....	.....	10	.90
Bedford.....	1,725.05	23.83	.24	.....	.....	24.07	1.39
Berks.....	2,424.11	30.54	.....	190	340.1	560.64	23.13
Blair.....	735.86	8.79	.....	111.21	30	150	20.38
Bradford.....	2,461.93	23.83	.24	.....	.....	24.07	.97
Bucks.....	1,817.07	30.54	.....	57.3	.....	87.84	4.83
Butler.....	1,831.43	13.83	.81	.....	.....	14.64	.79
Cambria.....	1,153.95	8.54	1.67	.....	.....	10.21	.88
Cameron.....	150.33	1.6	.....	.....	.....	1.6	1.06
Carbon.....	512.36	5.17	.46	.....	14.37	20	3.90
Center.....	1,058.28	9.3	.....	.....	.....	9.3	.87
Chester.....	2,536.11	33.31	.....	136.78	.....	170.09	6.70
Clarion.....	1,295.35	6.73	.....	.....	.....	6.73	.51
Clearfield.....	1,699.89	8.54	3.74	.....	.....	12.28	.72
Clinton.....	574.85	7.45	.....	.....	.....	7.45	1.30
Columbia.....	1,271.11	6.67	.....	2	.....	8.67	.68
Crawford.....	2,139.95	14.45	2.11	.....	.....	16.56	.77
Cumberland.....	1,225.58	12.22	.....	3.78	.....	16	1.30
Dauphin.....	993.25	7.75	.16	6.6	.....	14.51	1.46
Delaware.....	513.85	7.8	.....	212.35	.....	220.15	42.84
Elk.....	542.89	5.5	.....	2	.....	7.5	1.38
Erie.....	1,671.28	17.35	1.45	.....	.....	18.8	1.12
Fayette.....	1,674.54	15.05	.....	3	.....	18.05	1.07
Forest.....	374.45	2.75	.28	.....	.....	3.03	.80
Franklin.....	1,233.66	12.58	.....	45.67	.....	58.25	4.72
Fulton.....	714.45	.....	.....	.....	.....	.....	.....

¹ Philadelphia County has no rural roads; the entire county is included in the city of Philadelphia.² Includes 8.5 miles which have been resurfaced with asphalt and bituminous-macadam and 100 miles treated with asphaltic oil; also includes 22 miles of brick roads.

TABLE 69.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Total.	Approximate percentage of roads improved.
		State-aid roads.		Roads improved without State-aid.			
		Macadam.	Brick.	Macadam.	Gravel.		
Greene.....	1,498.77	8.91	0.88	6.21		16	1.06
Huntingdon.....	1,322.24	19.28				19.28	1.45
Indiana.....	1,929.68	18.10	.49	9.41		28	1.45
Jefferson.....	1,219.96	5.64	4.17			9.81	.80
Juniata.....	759.39						
Lackawanna.....	749.01	4.4				4.4	.58
Lancaster.....	2,820.67	31.71		184.74		216.45	7.67
Lawrence.....	865.13	9.35				9.35	1.08
Lebanon.....	830.77	8.2		99.8		108	12.99
Lehigh.....	1,200.74	12.15		30.85	15	58	4.83
Luzerne.....	2,330.00	17.59		8.7	9	35.29	1.51
Lycoming.....	1,670.98	15.09	.5			15.59	.93
McKean.....	750.89	8.27		2.73		11	1.46
Mercer.....	1,626.87	16.87		8		24.87	1.52
Mifflin.....	506.46	6.66				6.66	1.31
Monroe.....	962.22	20.53				20.53	2.13
Montgomery.....	1,754.03	24.93		387.02		411.95	23.48
Montour.....	357.79	1.71	.22			1.93	.53
Northampton.....	1,073.47	10.5		21.25		31.75	2.95
Northumberland.....	1,178.32	11.29	.88			12.17	1.03
Perry.....	989.67	1.55				1.55	.15
Pike.....	551.74			4.75		4.75	.86
Potter.....	1,135.24	10.85	.23	3.92		15	1.32
Schuylkill.....	1,568.69	10.42				10.42	.66
Snyder.....	787.85	2.02		3.98	40	46	5.83
Somerset.....	2,157.94	9.78	1.15	3.82		14.75	.68
Sullivan.....	552.37	3.15				3.15	.57
Susquehanna.....	1,993.12			4.4		4.4	.22
Tioga.....	1,809.42	18.89	.92	3.19		23	1.26
Union.....	493.75	4.24	.54			4.78	.96
Venango.....	1,165.55	6.69	3.94			10.63	.91
Warren.....	1,069.05	12.37	1.03			13.4	1.25
Washington.....	2,187.42	.23		134		143.23	6.54
Wayne.....	1,437.71	13.36		8.64		22	1.53
Westmoreland.....	2,761.99	28.55	.84			29.39	1.06
Wyoming.....	742.65	1.54				1.54	.20
York.....	2,672.04	12.8		7.2		20	.74
Total.....	87,386.79	741.64	29.15	² 2,148.87	436.1	³ 3,364.76	3.84

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Total.	Approximate percentage of roads improved.
		State-aid roads.		Roads improved without State aid.			
		Macadam.	Brick.	Macadam.	Gravel.		
1904.....	99,777	9.25		2,151.53		2,160.78	2.17
1909.....	87,386.79	741.64	29.15	² 2,148.87	436.1	³ 3,364.76	3.84
Gain.....		732.39	29.15		436.1	1,203.98	1.67

¹ Includes 9 miles of brick roads constructed without State-aid.² Includes 8.5 miles which have been resurfaced with asphalt and bituminous-macadam and 100 miles treated with asphaltic oil; also includes 22 miles of brick roads.³ Includes 8.5 miles of roads resurfaced with asphalt and bituminous-macadam, 100 miles treated with asphaltic oil, and 31 miles of brick roads.

TABLE 70.—Cost data, 1909.

County and township.	Average cost per mile.		County and township.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
	Dollars.	Dollars.		Dollars.	Dollars.
Adams.....		11,000.00	Delaware, townships and		
Allegheny.....		14,000.00	boroughs—Continued.		
Armstrong.....		12,000.00	Springfield.....		6,000.00
Berks, townships:			Swarthmore.....		1.90
Bern.....		10,000.00	Elk.....		11,500.00
Brecknock.....	2,240.00		Franklin.....		7,000.00
Caernarvon.....	500.00	2,000.00	Fulton.....		8,000.00
District.....	400.00		Greene.....		10,000.00
Hersford.....	2,200.00		Huntingdon.....		16,000.00
Muhlenberg.....	3,000.00		Indians.....		10,266.00
Spring.....	716.00	4,840.00	Juniata, township:		
Bradford.....		9,600.00	Fermanagh.....	800.00	
Butler.....		12,000.00	Lawrence.....		10,500.00
Cambria.....		11,000.00	Lebanon.....		5,000.00
Chester.....		9,000.00	Luzerne.....	2,440.00	16,042.00
Clarion.....		13,290.00	McKean.....		10,000.00
Columbia.....		10,500.00	Mercer.....		9,000.00
Cumberland.....		6,000.00	Mifflin.....		1,425.00
Delaware, townships and			Monroe.....		9,000.00
boroughs:			Perry.....		16,000.00
Birmingham.....		4,000.00	Potter.....		8,000.00
Clifton Heights.....		1.95	Susquehanna.....		10,306.00
Collingdale.....		1.72	Tioga.....		8,000.00
Edgemont.....		3,700.00	Venango.....		9,500.00
Glenolden.....		1.60	Warren.....		10,000.00
Morton.....		1.72	Wayne.....		9,000.00
Nether Providence.....		8,500.00			
Newtown.....		6,500.00	Average.....	1,575.00	9,164.00
Sharon Hill.....		1.80			

1 Per square yard.

RHODE ISLAND.

TABLE 71.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Bituminous-macadam.	Stone.	Gravel.	Total.	
Bristol.....	98.25	3.7	29.4	12.5	1 51.6	52.51
Kent.....	395		56.8	12.5	69.3	17.54
Newport.....	214.5	1.9	63	11	75.9	35.33
Providence.....	835.5	8.7	153.1	368	511.8	61.25
Washington.....	577.5	7.67	124.8	201	333.47	57.74
Total.....	2,120.75	21.97	409.1	605	1 1,042.07	49.14

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Bituminous-macadam.	Stone.	Gravel.	Total.	
1904.....	2,361		247	774.5	1,021.5	43.27
1909.....	2,120.75	21.97	409.1	605	1 1,042.07	49.14
Gain.....		21.97	162.1		20.57	5.87

1 Includes 6 miles of road classed as sand-clay.

SOUTH CAROLINA.

TABLE 72.—Mileage of public roads, 1909.

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Abbeville.....	1,000	20	45	236	301	30.10
Aiken.....	1,500			250	250	16.66
Anderson.....	100		5	5	10	10.00
Bamberg.....	400			125	125	31.24
Barnwell.....	900			185	185	20.55
Beaufort.....	900				² 15	1.66
Berkeley.....	1,500			10	10	.66
Calhoun.....	300			100	100	33.33
Charleston.....	670		9		³ 14	2.08
Cherokee.....	400	3			3	.75
Chester.....	600	16	4		20	3.33
Chesterfield.....	700			10	10	1.42
Clarendon.....	800					
Colleton.....	1,200					
Darlington.....	750			350	350	46.66
Dorchester.....	600			200	200	33.33
Edgefield.....	700					
Fairfield.....	850					
Florence.....	675	2		30	32	4.74
Georgetown.....	800			45	⁴ 57	7.12
Greenville.....	860	6	1		7	.87
Greenwood.....	500	10	10	18	38	7.60
Hampton.....	1,100			250	250	22.72
Horry.....	1,100			4	4	.36
Kershaw.....	800		4	119	123	15.37
Lancaster.....	600	6	6	23	35	5.83
Laurens.....	700	29	30	30	89	12.71
Lee.....	450			31	31	6.45
Lexington.....	1,200			90	90	7.50
Marion.....	1,200					
Marlboro.....	500		2	66	62	12.40
Newberry.....	600	10	10	1	21	3.50
Oconee.....	800					
Orangeburg.....	1,500			375	375	25.00
Pickens.....	600	1			1	.16
Richland.....	700	2.5		448	450.5	64.35
Saluda.....	500			10	10	2.00
Spartanburg.....	800	14			14	1.75
Sumter.....	900			75	75	8.33
Union.....	550	8.5			8.5	1.54
Williamsburg.....	100			30	30	30.00
York.....	700	25.75	5	108	138.75	19.82
Total.....	32,075	153.75	131	3,218	⁵ 3,534.75	11.02

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	41,830	69	179	1,575	⁶ 1,878	4.49
1909.....	32,075	153.75	131	3,218	⁶ 3,534.75	11.02
Gain.....		84.75		1,643	1,656.75	6.54

¹ Dillon County established from part of Marion County, 1910.² Shell.³ Includes 5 miles of shell roads.⁴ Includes 12 miles of shell roads.⁵ Includes 32 miles of shell roads.⁶ Includes 55 miles of shell roads.

TABLE 73.—Cost data, 1909.

County.	Average cost per mile.			County.	Average cost per mile.		
	Sand-clay.	Gravel.	Macadam.		Sand-clay.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.		Dollars.	Dollars.	Dollars.
Aiken.....	300			Kershaw.....	500	600	
Anderson.....				Lancaster.....	310		2,460
Barnwell.....	400			Lexington.....	400		
Charleston.....		1,800		Marlboro.....	400		
Cherokee.....			2,500	Newberry.....	450		
Chester.....	1,000	1,000	2,500	Orangeburg.....	325		
Darlington.....	275			Richland.....	400		
Dorchester.....	300			Spartanburg.....			1,800
Florence.....	250			Sumter.....	400		
Georgetown.....	400			Union.....			7,000
Greenwood.....	275			Average.....	415	1,133	3,252
Hampton.....	600						
Horry.....	450						

SOUTH DAKOTA.

TABLE 74.—Mileage of public roads, 1909.

County. ¹	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
Armstrong.....	1,400				
Aurora.....	700				
Beadle.....	1,300				
Bonhomme.....	500				
Boreman.....	1,000				
Brookings.....	792				
Brown.....	1,723				
Brule.....	800		5	5	0.62
Buffalo.....	494	5		5	1.01
Butte.....	1,000				
Campbell.....	1,000				
Charles Mix.....	1,100				
Clark.....	900				
Clay.....	500	25		25	5.00
Codington.....	800	5		5	.62
Custer.....	400				
Davison.....	432		18	18	4.16
Day.....	1,500				
Deuel.....	600				
Dewey.....	2,000		6	6	.30
Douglas.....	500				
Edmunds.....	1,408	24		24	1.70
Fall River.....	350				
Faulk.....	1,038				
Grant.....	700				
Gregory.....	1,000				
Hamlin.....	500				
Hand.....	1,500				
Hanson.....	500	4		4	.80
Hughes.....	1,000				
Hutchinson.....	900				
Hyde.....	900				
Jerauld.....	500				
Kingsbury.....	850				
Lake.....	566				
Lawrence.....	500				
Lincoln.....	66	1		1	1.51
Lyman.....	3,000				
McCook.....	575				
McPherson.....	224				
Marshall.....	900				

¹ Boreman County has, since this investigation was completed, been absorbed in Corson County; Corson County established from part of the Standing Rock Indian Reservation in 1909; Harding County established from part of Butte County in 1909; Mellette County established from part of the Rosebud Indian Reservation in 1909, and Todd County established from part of the Rosebud Indian Reservation in 1909, all after this investigation was completed; Meyer County has, since 1909, been divided up between Todd and Mellette counties; Zeibach County established from Schuassé and Sterling Counties and part of Armstrong County, February, 1911.

TABLE 74.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
Meade.....	1,500	15	50	175	5.00
Meyer.....	1,500				
Miner.....	700				
Minnehaha.....	1,000				
Moody.....	600				
Pennington.....	800				
Perkins.....	900				
Potter.....	900				
Roberts.....	1,162	18		18	1.54
Sanborn.....	800	50		50	6.25
Shannon.....	1,000				
Spink.....	1,500				
Stanley.....	2,000				
Sterling.....	250				
Sully.....	1,000		50	50	5.00
Tripp.....	1,400				
Turner.....	700				
Union.....	495				
Walworth.....	700				
Washabaugh.....	400				
Washington.....	(?)				
Yankton.....	654				
Total.....	56,354	147	129	1,286	.50

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Gravel.	Sand-clay.	Total.	
1904.....	59,295	147		3151	0.25
1909.....	56,354	147	129	1,286	.50
Gain.....			129	135	.25

¹ Includes 10 miles of macadam.² No report received from this county.³ Includes 4 miles of roads surfaced with stone.

TENNESSEE.

TABLE 75.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Anderson.....	350	70	4	74	21.14
Bedford.....	475	125		125	26.31
Benton.....	430		15	15	3.48
Bledsoe.....	300		10	10	3.33
Blount.....	550	13		13	2.36
Bradley.....	325	5	175	180	55.38
Campbell.....	560	43	12	55	9.82
Cannon.....	325		7	7	2.15
Carroll.....	625				
Cartier.....	350				
Cheatam.....	300		14	14	4.66
Chester.....	200				
Claborne.....	450	5		5	1.11
Clay.....	350		5	5	1.42
Cocke.....	400	80		80	20.00
Coffee.....	375				
Crockett.....	365				
Cumberland.....	550				
Davidson.....	600	182	60	242	40.33
Decatur.....	350		43.5	43.5	12.42
Dekalb.....	350	50	25	75	21.41

TABLE 75.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Dickson.....	500		4	4	.80
Dyer.....	480	10	10	20	4.16
Fayette.....	600				
Fentress.....	450				
Franklin.....	600	2		2	.33
Gibson.....	600				
Giles.....	600	50	125	175	29.16
Grainger.....	300	5		5	1.66
Greene.....	600	1		1	.16
Grundy.....	300				
Hamblen.....	300	96		96	32.00
Hamilton.....	600	125	20	145	24.16
Hancock.....	210				
Hardeman.....	750		3	3	.40
Hardin.....	700		20	20	2.85
Hawkins.....	700	25		25	3.71
Haywood.....	555		7	7	1.25
Henderson.....	400				
Henry.....	400	3.5		3.5	.87
Hickman.....	707				
Houston.....	215		5	5	2.32
Humphreys.....	555				
Jackson.....	325				
James.....	166		30	30	18.07
Jefferson.....	300	103		103	34.33
Johnson.....	200				
Knox.....	1,026	248	1	249	24.26
Lake.....	114				
Lauderdale.....	450	4.5	4.5	9	2.00
Lawrence.....	750	30	10	40	5.33
Lewis.....	250		20	20	8.00
Lincoln.....	795	13	140	153	19.24
Loudon.....	200				
McMinn.....	450		30.5	30.5	6.77
McNairy.....	570				
Macon.....	250				
Madison.....	500	65		192	38.40
Marion.....	500	22	18	40	8.00
Marshall.....	250	125	20	145	58.00
Mauzy.....	836	215	111	326	38.99
Meigs.....	225		3	3	1.33
Monroe.....	500	10		10	2.00
Montgomery.....	700	32	94	126	18.00
Moore.....	200		10	10	5.00
Morgan.....	300				
Obion.....	700				
Overton.....	500				
Perry.....	400				
Pickett.....	250				
Polk.....	500				
Putnam.....	400	78		78	19.50
Rhea.....	342	5	11	16	4.67
Roane.....	550	45	8	53	9.63
Robertson.....	500				
Rutherford.....	1,000	275	175	450	45.00
Scott.....	500	9		9	1.80
Squatchie.....	250		12	12	4.80
Savier.....	575	25	6	31	5.39
Shelby.....	2,500		600	600	24.00
Smith.....	400		190	190	47.50
Stewart.....	350	1	25	26	7.42
Sullivan.....	550	75		75	13.63
Sumner.....	840	100	250	350	41.66
Tipton.....	300				
Trousdale.....	160		20	20	12.50
Unicoi.....	89				
Union.....	235	35		35	14.89
Van Buren.....	250				
Warren.....	533		72	72	13.50
Washington.....	300	2	1	3	1.00
Wayne.....	700		16	16	2.28
Weakley.....	550				
White.....	370	100	20	120	32.43
Williamson.....	700	35	80	115	16.42
Wilson.....	1,000	140		140	14.00
Total.....	45,913	2,684	2,542.5	15,353.5	11.66

1 Includes 127 miles of sand-clay roads.

TABLE 75.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	48,989	1,774	2,511	4,285	8.75
1909.....	45,913	2,684	2,542.5	5,226.5	11.65
Gain.....		910	31.5	1,068.5	2.91

¹ Includes 127 miles of sand-clay roads.

TABLE 76.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Sand-clay.	Gravel.	Macadam.		Sand-clay.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.		Dollars.	Dollars.	Dollars.
Anderson.....			4,000.00	Marshall.....			1,000.00
Bradley.....		1,000.00	2,500.00	Montgomery.....		1,200.00	3,000.00
Campbell.....		2,500.00	3,500.00	Overton.....			1,500.00
Claiborne.....			4,000.00	Rhea.....		800.00	
Cocke.....			3,000.00	Roane.....			² .30
Decatur.....		1,000.00		Scott.....			4,000.00
Greene.....	1,250.00			Sequatchie.....		1,500.00	
Hamblen.....			3,000.00	Sevier.....			2,000.00
Hamilton.....			2,000.00	Shelby.....		1,350.00	
Hardin.....		¹ 1.00		Sullivan.....			4,000.00
Hawkins.....			1,500.00	Sumner.....	400.00		700.00
Henry.....		1,855.00		Trousdale.....		2,000.00	
Jefferson.....		1,600.00	3,100.00	Union.....			1,800.00
Knox.....			4,500.00	Warren.....		2,000.00	2,000.00
Lake.....		5,000.00		Wayne.....		750.00	
Lincoln.....		400.00		Williamson.....			800.00
Madison.....	1,500.00		5,100.00	Average.....	1,050.00	1,097.00	2,727.00
Marion.....		2,500.00	3,000.00				

¹ This road was built in Shiloh National Park at the rate of \$1 per square yard.

² Per square yard.

TEXAS.

TABLE 77.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Anderson.....	750			20	20	2.66
Andrews.....	² 160					
Angelina.....	350					
Aransas.....	44				³ 10	22.72
Archer.....	475					
Armstrong.....	175			15	15	8.57
Atascosa.....	335			60	60	17.91
Austin.....	1,068			5	5	.46
Bailey.....	² 165					
Bandera.....	700					
Bastrop.....	500			25	25	5.00
Baylor.....	165			.25	.25	.15
Bee.....	500			5	5	1.00
Bell.....	2,000					

¹ Brooks County established from parts of Hidalgo, Starr, and Zapata Counties, 1911; Culberson County established from part of El Paso County, 1911; and Jim Wells County established from part of Nueces County, 1911.

² Sparsely settled. No report.

³ Shell.

TABLE 77.—Mileage of public roads, 1909—Continued.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Bexar.....	1,500		180	20	200	13.33
Blanco.....	255					
Borden.....	107					
Bosque.....	600		15		15	2.50
Bowie.....	1,000		40		40	4.00
Brazoria.....	600					
Brazos.....	750			5	5	.66
Brewster.....	450					
Briscoe.....	250					
Brown.....	700		30		30	4.28
Burleson.....	600			10	10	1.66
Burnet.....	900					
Caldwell.....	500		11	3	14	2.80
Calhoun.....	95					
Callahan.....	525			40	40	7.61
Cameron.....	700					
Camp.....	300					
Carson.....	150					
Cass.....	1,200					
Castro.....	180					
Chambers.....	165				15	3.03
Cherokee.....	1,125			70	70	6.22
Childress.....	225					
Clay.....	1,500		5		5	.33
Cochran.....	150					
Coke.....	180					
Coleman.....	600					
Collin.....	1,350		2.5		2.5	.17
Collingsworth.....	200					
Colorado.....	948					
Comal.....	375	20	50	30	100	26.66
Comanche.....	700			105	105	15.00
Concho.....	200					
Cooke.....	700		10		10	1.42
Coryell.....	1,200					
Cottle.....	325					
Crane.....	100					
Crockett.....	250					
Crosby.....	70					
Dallam.....	50			1	1	2.00
Dallas.....	2,500	11	207		218	8.72
Dawson.....	100					
De Witt.....	1,000		35	60	95	9.50
Deaf Smith.....	150			20	20	13.33
Delta.....	375					
Denton.....	640		10	5	15	2.34
Dickens.....	130					
Dimmit.....	130			20	20	15.38
Donley.....	300		20		20	6.66
Duval.....	740					
Eastland.....	1,260			50	50	3.96
Ector.....	60					
Edwards.....	425					
El Paso.....	310	2		56.5	58.5	18.87
Ellis.....	2,500		130.5		130.5	5.22
Erath.....	1,200	1	60		61	5.08
Falls.....	1,500		50		50	3.33
Fannin.....	1,500					
Fayette.....	1,500		50	50	100	6.66
Fisher.....	318					
Floyd.....	460					
Foard.....	400					
Fort Bend.....	400			3	3	5.75
Franklin.....	500					
Freestone.....	900					
Frio.....	250			25	25	10.00
Gaines.....	160			1	1	.62
Galveston.....	163				11	6.74
Garza.....	80					
Gillespie.....	300			17	17	5.66
Glasscock.....	78					
Goliad.....	500			3	3	.60
Gonzales.....	1,000		30	15	45	4.50
Gray.....	200					
Grayson.....	1,600	.25			.25	.01
Gregg.....	300					
Grimes.....	800					
Guadalupe.....	700	3	150	70	223	31.85
Hale.....	250			5	5	2.00

¹ Shell.² Includes 20 miles of shell roads.

TABLE 77.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Hall.....	300					
Hamilton.....	500		30		30	6.00
Hansford.....	50					
Hardeman.....	325					
Hardin.....	700			10	10	1.42
Harris.....	2,500		180		1 265	10.60
Harrison.....	1,000	3		160	163	16.30
Hartley.....	40					
Haskell.....	750					
Hays.....	600		40		40	6.66
Hemphill.....	125			7	7	5.60
Henderson.....	525					
Hidalgo.....	600					
Hill.....	1,000		6	2	8	.80
Hockley.....	60					
Hood.....	575					
Hopkins.....	900					
Houston.....	850			10	10	1.17
Howard.....	290			10	10	3.44
Hunt.....	1,600					
Hutchinson.....	(²) 140					
Irion.....	140					
Jack.....	325	5		100	105	32.30
Jackson.....	450			120	120	26.66
Jasper.....	1,000					
Jeff Davis.....	150					
Jefferson.....	562	85			85	15.12
Johnson.....	750		25	10	35	4.66
Jones.....	800			10	10	1.25
Karnes.....	800			3	3	.37
Kaufman.....	1,200			2	2	.16
Kendall.....	300					
Kent.....	240					
Kerr.....	400		7	10	17	4.25
Kimble.....	200					
King.....	150					
Kinney.....	162					
Knox.....	200					
La Salle.....	300					
Lamar.....	1,500			4	4	.26
Lamb.....	60					
Lampasas.....	600			25	25	4.16
Lavaca.....	1,300		.5		.5	.03
Lee.....	500					
Leon.....	960					
Liberty.....	500			150	150	30.00
Limestone.....	800			4	4	.50
Lipscomb.....	110					
Live Oak.....	350					
Llano.....	488					
Loving.....	(³) 180					
Lubbock.....	180					
Lynn.....	190					
McCulloch.....	300					
McLennan.....	1,200		85		85	7.08
McMullen.....	105					
Madison.....	300					
Marion.....	235					
Martin.....	40					
Mason.....	400			100	100	25.00
Matagorda.....	900					
Maverick.....	300					
Medina.....	400			5	5	1.25
Menard.....	150					
Midland.....	100					
Milam.....	1,450		10	25	35	2.41
Mills.....	450					
Mitchell.....	250					
Montague.....	900					
Montgomery.....	750			300	300	40.00
Moore.....	60					
Morris.....	300					
Motley.....	135					
Nacogdoches.....	1,000			12	12	1.20
Navarro.....	1,600					
Newton.....	390					
Nolan.....	150					

¹ Includes 60 miles of shell roads and 25 miles of crushed-rock roads with shell screening.

² Reports received indicate that there are no public roads in this county.

³ Sparsely settled. No report.

TABLE 77.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Nueces.....	900				1 20	2.22
Ochiltree.....	95					
Oldham.....	200					
Orange.....	375	15			15	4.00
Palo Pinto.....	350					
Panola.....	700					
Parker.....	875					
Parmer.....	168					
Pecos.....	262			15	15	5.72
Polk.....	600					
Potter.....	120		1		1	.83
Presidio.....	327			25	25	7.64
Rains.....	150					
Randall.....	80					
Reagan.....	165					
Red River.....	1,254					
Reeves.....	47					
Refugio.....	110					
Roberts.....	60					
Robertson.....	500					
Rockwall.....	250					
Runnels.....	350					
Rusk.....	600					
Sabine.....	300					
San Augustine.....	500					
San Jacinto.....	300					
San Patricio.....	136					
San Saba.....	500					
Schleicher.....	175					
Scurry.....	500			10	10	2.00
Shackelford.....	500		.5		.5	.10
Shelby.....	600					
Sherman.....	163					
Smith.....	1,200			20	20	1.66
Somervell.....	250		5		5	2.00
Starr.....	350			75	75	21.42
Stephens.....	300			1	1	.33
Sterling.....	136					
Stonewall.....	189			12	12	6.66
Sutton.....	200					
Swisher.....	90					
Tarrant.....	1,200		300	30	330	27.50
Taylor.....	800		4	6	10	1.25
Terrell.....	155					
Terry.....	240			5	5	2.08
Throckmorton.....	175					
Titus.....	300			10	10	3.33
Tom Green.....	400					
Travis.....	1,500	125	50		175	11.66
Trinity.....	250					
Tyler.....	500			25	25	5.00
Upsur.....	850		3		3	.35
Upton.....	100					
Uvalde.....	350					
Val Verde.....	500		75		75	15.00
Van Zandt.....	1,021					
Victoria.....	500		17		17	3.40
Walker.....	400		1	10	11	2.75
Waller.....	200					
Ward.....	125					
Washington.....	256					
Webb.....	231		25	100	125	54.11
Wharton.....	500			1	1	.20
Wheeler.....	175					
Wichita.....	300		3		3	1.00
Wilbarger.....	600		4		4	.66
Williamson.....	2,000	55	8		63	3.15
Wilson.....	1,000					
Winkler.....	125					
Wise.....	1,700	40	10		50	2.94
Wood.....	600			8	8	1.33
Yoakum.....	240					
Young.....	800		150	6	156	19.50
Zapata.....	257					
Zavalla.....	120			1	1	8.33
Total.....	128,971	365.25	2,126	2,253.75	2 4,896	3.80

¹ Shell.² Includes 126 miles of shell roads and 25 miles of crushed-rock roads with shell screening.

TABLE 77.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	121,409	167	1,909	.....	12,128	1.75
1909.....	128,971	365.25	2,126	2,253.75	4,896	3.89
Gain.....	7,562	198.25	217	2,253.75	2,768	2.65

¹ Includes 52 miles of shell roads.² Includes 126 miles of shell roads and 25 miles of crushed-rock roads with shell screenings.TABLE 78.—*Cost data, 1909.*

County.	Average cost per mile.				
	Earth.	Sand-clay.	Shell.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Anderson.....		1,500			
Aransas.....		450			
Archer.....		100			
Atascosa.....		800			
Austin.....		500			
Bastrop.....		600			
Bexar.....		2,000		3,400	
Bosque.....				700	
Bowie.....				4,000	
Brown.....				1,750	
Burleson.....		400			
Caldwell.....		1,200		2,000	
Callahan.....		450			
Carson.....		100			
Chambers.....		200			
Cherokee.....		100			
Collin.....				1,500	
Comal.....		1,500		2,500	3,000
Comanche.....		300			
Cooke.....				1,000	
Dallam.....		200			
Dallas.....		600		2,500	3,500
Eastland.....		1,500			
El Paso.....		250			
Ellis.....				2,500	
Erath.....				350	1,000
Falls.....				2,000	
Fayette.....		1,200		3,000	
Frio.....		750			
Gaines.....		500			
Galveston.....	200		2,750		
Gillespie.....		800			
Gonzales.....		950			
Guadalupe.....		800		1,500	
Harrison.....		100			
Hays.....				2,000	
Howard.....		250			
Jack.....		100			1,000
Jefferson.....			5,000		
Jones.....		200			
Kerr.....		200		600	
Lamar.....		900			
Lampasas.....		400			
McLennan.....				1,600	
Matagorda.....			1,500		
Milam.....				2,000	
Nacogdoches.....		750			
Potter.....	80			1,500	
San Patricio.....	100				
Scurry.....		100			
Smith.....		800			
Stephens.....		250			
Tarrant.....		900		1,750	
Taylor.....		400		350	

TABLE 78.—*Cost data, 1909—Continued.*

County.	Average cost per mile.				
	Earth.	Sand-clay.	Shell.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Terry.....		60			
Tyler.....		100			
Uvalde.....				800	
Val Verde.....				100	
Victoria.....				2,500	
Ward.....	400				
Wilbarger.....	60				
Williamson.....				1,000	
Wise.....				2,000	2,800
Wood.....				900	
Average.....	168	593	3,083	1,708	2,160

UTAH.

TABLE 79.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Beaver.....	122			20	20	16.39
Boxelder.....	509					
Cache.....	400		35		35	8.75
Carbon.....	500			125	125	25.00
Davis.....	259	4	50		74	29.60
Emery.....	160			41	41	25.62
Garfield.....	160					
Grand.....	260			11	11	4.23
Iron.....	260		3		3	1.15
Juab.....	97			7	7	7.21
Kane.....	200					
Millard.....	500			4.5	4.5	.90
Morgan.....	70		3		3	4.28
Piute.....	350			50	50	14.28
Rich.....	150		10	25	35	23.33
Salt Lake.....	350	33	125		1208.5	59.57
San Juan.....	250			18	18	7.20
Sanpete.....	215					
Sevier.....	500		40	170	210	42.00
Summit.....	200			5	5	2.50
Tooele.....	1,000		4		4	.40
Uinta.....	559			13	13	2.32
Utah.....	400	5	40		45	11.25
Wasatch.....	200		2	20	22	11.00
Washington.....	200					
Wayne.....	200					
Weber.....	267		20	64	84	31.46
Total.....	8,320	42	332	643.5	1,018	12.23

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	7,090	11	597		608	8.57
1909.....	8,320	42	332	643.5	1,018	12.23
Gain.....	1,230	31		643.5	410	3.66

¹ Includes 0.5 mile of bituminous-macadam road.

TABLE 80.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Sand-clay.	Gravel.	Mac-adam.		Sand-clay.	Gravel.	Mac-adam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Beaver.....		1 0. 45		San Juan.....	500. 00		
Carbon.....	² 0. 20			Sevier.....	200. 00	500. 00	
Emery.....	160. 00			Uinta.....		1,500. 00	5,000. 00
Grand.....	200. 00			Weber.....	3,000. 00	5,000. 00	
Juab.....	250. 00			Average.....	718. 00	2,188. 00	5,000. 00
Salt Lake.....		1,750. 00	5,000. 00				

¹ Per square yard.² Per cubic yard.

VERMONT.

TABLE 81.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
Addison.....	1,112	107. 02	202. 70	309. 72	27. 85
Bennington.....	750	16	228. 35	244. 35	32. 58
Caledonia.....	1,146	16. 93	60. 02	76. 95	6. 71
Chittenden.....	811	34. 96	213. 72	248. 68	30. 66
Essex.....	425	6. 84	16. 43	23. 27	5. 47
Franklin.....	1,017	37. 77	38. 53	76. 30	7. 50
Grand Isle.....	170	16. 68	79. 63	96. 31	56. 65
Lamoille.....	676	13. 41	72. 44	85. 85	12. 85
Orange.....	1,405	35. 26	114. 78	150. 04	10. 67
Orleans.....	1,114	19. 05	139. 88	158. 93	14. 26
Rutland.....	1,303	73. 85	421. 66	495. 51	38. 02
Washington.....	1,192	39. 72	243. 98	283. 70	23. 80
Windham.....	1,424	21. 54	124. 51	146. 05	10. 25
Windsor.....	1,861	27. 62	227. 35	254. 97	13. 70
Total.....	14,406	466. 65	2,183. 98	2,650. 63	18. 40

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.			Approximate percentage of roads improved.
		Stone.	Gravel.	Total.	
1904.....	14,521	281	1,672. 5	1,953. 5	13. 45
1909.....	14,406	466. 65	2,183. 98	2,650. 63	18. 40
Gain.....		185. 65	511. 48	697. 13	4. 95

VIRGINIA.

TABLE 82.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Accomac.....	550	5.25			5.25	0.95
Albemarle.....	700	5	2.5	0.75	8.25	1.17
Alexandria.....	100	10	21		31	31.00
Alleghany.....	300		¹ 15		15	5.00
Amelia.....	375					
Amherst.....	500	22			22	4.40
Appomattox.....	300			3	3	1.00
Augusta.....	1,200	60.5			60.5	5.04
Bath.....	300	7			7	2.33
Bedford.....	800	6.5			6.5	1.81
Bland.....	225					
Botetourt.....	525					
Brunswick.....	450		5		5	1.11
Buchanan.....	305					
Buckingham.....	600					
Campbell.....	518	11			11	2.12
Caroline.....	750		15		15	2.00
Carroll.....	500					
Charles City.....	200		2	20	22	11.00
Charlotte.....	600	5			5	1.83
Chesterfield.....	500		100		100	20.00
Clarke.....	150	40			40	26.66
Craig.....	200					
Culpeper.....	450	13.5			13.5	3.00
Cumberland.....	300		.25		.25	.08
Dickenson.....	200	10			10	5.00
Dinwiddie.....	500		120		120	24.00
Elizabeth City.....	75	4			² 34	45.33
Essex.....	200			2	2	1.00
Fairfax.....	600	45			45	7.50
Fauquier.....	500	10.5			10.5	2.10
Floyd.....	500	10			10	2.00
Fluvanna.....	252					
Franklin.....	700					
Frederick.....	610	78			78	12.78
Giles.....	400					
Gloucester.....	200					
Goochland.....	300	2		25	27	9.00
Grayson.....	500					
Greene.....	150					
Greensville.....	245		103		103	42.04
Halifax.....	1,000			³ 35	35	3.50
Hanover.....	600	6			6	1.00
Henrico.....	450	5	205		211	46.88
Henry.....	586					
Highland.....	250	5	10		15	6.00
Isle of Wight.....	500			6	6	1.20
James City.....	150	4	4	4	12	8.00
King and Queen.....	400					
King George.....	350					
King William.....	275					
Lancaster.....	175			8	8	4.57
Lee.....	450	5			5	1.11
Loudoun.....	750	12	6		18	2.40
Louisa.....	500			14	14	2.80
Lunenburg.....	500					
Madison.....	450					
Mathews.....	100					
Mecklenburg.....	690	55			55	7.97
Middlesex.....	200					
Montgomery.....	400	27			27	6.75
Nansemond.....	500			20	20	4.00
Nelson.....	450					
New Kent.....	275					
Norfolk.....	425	30			² 60	14.11
Northampton.....	150					
Northumberland.....	265					
Nottoway.....	365	2		18	20	5.47
Orange.....	480	29			29	6.04

¹ Constructed with slag from blast furnaces.

² Includes 30 miles of shell roads.

³ These roads are built of gray soil, which makes an excellent material. It is said to be superior even to crushed stone. The road-building quality of this material was discovered only within the last few years.

TABLE 82.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Page.....	300	16			16	5.33
Patrick.....	500					
Pittsylvania.....	1,250	9.25			9.25	.74
Powhatan.....	250		1		1	.40
Prince Edward.....	300	19			19	6.33
Prince George.....	350					
Prince William.....	400					
Princess Anne.....	200				1.25	12.50
Pulaski.....	400	20			20	5.00
Rappahannock.....	250	40			40	16.00
Richmond.....	150					
Roanoke.....	350	37			37	10.57
Rockbridge.....	650	25			25	3.84
Rockingham.....	1,225	72			72	5.87
Russell.....	600	40			40	6.66
Scott.....	750					
Shenandoah.....	550	43			43	7.81
Smyth.....	350	30			30	8.57
Southampton.....	700			12	12	1.71
Spotsylvania.....	400					
Stafford.....	350	1.5		1.5	3	.85
Surry.....	350			4	4	1.14
Sussex.....	600			4	4	.66
Tazewell.....	600	21.5			21.5	3.58
Warren.....	300	8			8	2.66
Warwick.....	60				1.6	10.00
Washington.....	800	40			40	5.00
Westmoreland.....	250			8.25	8.25	3.30
Wise.....	300	10			2.14	4.66
Wythe.....	700	54			54	7.71
York.....	200					
Total.....	43,399	1,011.5	610.75	185.5	3 1,902.75	4.33

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	51,812	755	720	.....	4 1,600	3.09
1909.....	43,399	1,011.5	610.75	185.5	3 1,902.75	4.33
Gain.....	.....	256.5	.....	185.5	302.75	1.29

¹ Shell.² This county reports 4 miles of bituminous-macadam roads.³ Includes 91 miles of shell roads and 4 miles of bituminous-macadam roads.⁴ Includes 25 miles of slag roads and 100 miles of shell roads.

TABLE 83.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Sand-clay.	Gravel.	Macadam.		Sand-clay.	Gravel.	Macadam.
	Dollars.	Dollars.	Dollars.		Dollars.	Dollars.	Dollars.
Accomac.....			6,000	James City.....			6,000
Albemarle.....			5,000	Lee.....			4,500
Alexandria.....		5,000	6,000	Montgomery.....			6,000
Amherst.....			4,500	Nansemond.....	500		6,000
Augusta.....			4,000	Norfolk.....			6,000
Campbell.....			4,000	Nottoway.....	600		4,900
Charles City.....	500			Orange.....			4,000
Charlotte.....			3,000	Pittsylvania.....			7,000
Chesterfield.....		800		Prince Edward.....			4,400
Culpeper.....			4,900	Roanoke.....			4,000
Dickenson.....			6,000	Russell.....			6,000
Dinwiddie.....		1,500		Smyth.....			3,000
Elizabeth City.....			7,000	Surry.....	800		
Essex.....	700			Sussex.....		900	
Fauquier.....			4,000	Tazewell.....			4,500
Frederick.....			1,750	Washington.....			4,500
Greensville.....		1,000		Westmoreland.....	400		
Halifax.....				Wise.....			5,400
Henrico.....		4,000	6,500				
Isle of Wight.....	750			Average.....	607	2,200	4,920

WASHINGTON.

TABLE 84.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adams.....	1,650					
Asotin.....	350					
Benton.....	585.6	4.75			4.75	0.81
Chehalis.....	300		273		273	91.00
Chelan.....	328		1.33		1.33	.40
Clallam.....	400		67	23	90	22.50
Clarke.....	500	5	207		213	42.60
Columbia.....	400		1.5		1.5	.37
Cowlitz.....	700	5	4	20	29	4.14
Douglas.....	1,800		106	228	334	18.55
Ferry.....	267					
Franklin.....	500					
Garfield.....	350					
Grant.....	1,700		4		4	.23
Island.....	300		56.64	1.25	57.89	19.29
Jefferson.....	800					
King.....	1,200	12.63	600	.50	613.13	51.09
Kitsap.....	250					
Kittitas.....	700	.25			.25	.03
Klickitat.....	1,000					
Lewis.....	740	6	97.5		103.5	13.98
Lincoln.....	3,000					
Mason.....	300		160	20	180	60.00
Okanogan.....	500					
Pacific.....	460	1.5	54	2.7	58.2	12.65
Pierce.....	638	10	420.25	(²)	445.15	69.77
San Juan.....	165	.25	84		84.25	51.06
Skagit.....	1,019	4	158	214	376	36.89
Skamania.....	115	2	2		4	3.47
Snohomish.....	1,500		417	409	826	55.06
Spokane.....	3,000	16.5	50	1	69.5	2.31
Stevens.....	1,500					
Thurston.....	300		155		155	51.66
Wahkiakum.....	104	15	18		33	31.73
Walla Walla.....	1,200	5.13			5.13	.42
Whatcom.....	662	1.5	222	304	527.5	79.68
Whitman.....	3,500	8.65			8.65	.24
Yakima.....	1,500	2.25	20.7		22.95	1.53
¹ Total.....	34,283.6	100.41	3,178.92	1,223.45	64,520.68	13.19

¹ Pend Oreille County established from part of Stevens County, 1911.

² Includes 1 mile of bituminous-macadam roads.

³ This county reports 440.4 miles of sand-clay roads. This is evidently an error, as there are only 638 miles of public roads reported for the county.

⁴ Includes 14.9 miles of bituminous-macadam roads.

⁵ Includes 2 miles of bituminous-macadam roads.

⁶ Includes 17.9 miles of bituminous-macadam roads.

TABLE 84.—*Mileage of public roads*—Continued.
RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	31,998	48.5	1,928	.....	1,976.5	6.17
1909.....	34,283.6	100.41	3,178.92	1,223.45	4,520.68	13.19
Gain.....	2,285.6	51.91	1,250.92	1,223.45	2,544.18	7.01

¹ Includes 17.9 miles of bituminous-macadam roads.

TABLE 85.—*Cost data, 1909.*

County.	Average cost per mile.		County.	Average cost per mile.	
	Gravel.	Macadam.		Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>
Benton.....		4,500.00	Snohomish.....	3,900.00	
Chehalis.....	2,000.00		Thurston.....	1,600.00	
Douglas.....	1.30		Walla Walla.....		2.100
King.....		2.85	Whatcom.....	4,000.00	
Lewis.....	2,000.00	10,000.00	Whitman.....		8,300.00
Pacific.....	1,500.00		Average.....	2,600.00	7,600.00
San Juan.....	2.30				
Skagit.....	3,200.00				

¹ Per cubic yard.

² Per square yard.

WEST VIRGINIA.

TABLE 86.—*Mileage of public roads, 1909.*

County.	Total mileage of all public roads.	Mileage of roads dragged. ¹	Mileage of roads improved.			Approximate percentage of roads improved.
			Stone.	Gravel.	Total. ²	
Barbour.....	³ 636					
Berkeley.....	456	4	65		65	14.25
Boone.....	³ 281					
Braxton.....	³ 780	4				
Brooke.....	³ 180		16		16	8.88
Cabell.....	³ 300		1	1.5	2.5	.83
Calhoun.....	³ 500					
Clay.....	³ 375					
Doddridge.....	³ 600	3				
Fayette.....	³ 933	2	2.5		2.5	.26
Gilmer.....	³ 575		.25		.25	.04
Grant.....	311	4				
Greenbrier.....	827	10				
Hampshire.....	³ 950	2				
Hancock.....	³ 184	8				
Hardy.....	³ 500	9				
Harrison.....	760	50	10		10	1.31
Jackson.....	³ 1,200	10				
Jefferson.....	315		168		168	53.33
Kanawha.....	815	10	2		2	.24
Lewis.....	³ 650	10				
Lincoln.....	³ 665	1				
Logan.....	³ 200	1				
McDowell.....	³ 300	6	7		7	2.33
Marion.....	766	17	2.5		2.5	.32
Marshall.....	678	4	68	5	73	10.76
Mason.....	³ 900					
Mercer.....	³ 375	3	2.4		2.4	.64
Mineral.....	³ 300	1				
Mingo.....	³ 350					

¹ With split-log drag.

² Not including dragged roads.

³ Estimated by the State commissioner of public roads.

TABLE 86.—*Mileage of public roads, 1909—Continued.*

County.	Total mileage of all public roads.	Mileage of roads dragged.	Mileage of roads improved.			Approximate percentage of roads improved.
			Stone.	Gravel.	Total. ¹	
Monongalia.....	2 800	13	25	15	40	5.00
Monroe.....	2 700	10				
Morgan.....	300	1				
Nicholas.....	2 516					
Ohio.....	290		150		155	77.50
Pendleton.....	2 417					
Pleasants.....	2 286					
Pocahontas.....	2 500		4		4	.80
Preston.....	2 1,200	4				
Putnam.....	2 525	4				
Raleigh.....	2 600					
Randolph.....	1,000	2				
Ritchie.....	2 783	3				
Roane.....	2 700	6				
Summers.....	485					
Taylor.....	363	14	3		3	.82
Tucker.....	2 915	6				
Tyler.....	2 510	18	6.25		6.25	1.22
Upshur.....	800	5				
Wayne.....	2 800	6				
Webster.....	2 338					
Wetzel.....	2 656	17	11	6	17	3.90
Wirt.....	2 413	11				
Wood.....	2 1,140	28		6	6	.52
Wyoming.....	2 500					
Total.....	32,109	307	543.9	33.5	591.4	1.84

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of roads dragged.	Mileage of roads improved.			Approximate percentage of roads improved.
			Stone.	Gravel.	Total. ¹	
1904.....	26,178		217	26.5	243.5	0.97
1909.....	32,109	307	543.9	33.5	591.4	1.84
Gain.....	5,931	307	326.9	7.0	348.9	.87

¹ Not including dragged roads.² Estimated by the State commissioner of public roads.³ Includes 5 miles of sand-clay roads.⁴ Includes 9 miles of sand-clay roads.⁵ Includes 14 miles of sand-clay roads.⁶ Includes 11 miles of brick roads.TABLE 87.—*Cost data, 1909.*

County.	Average cost per mile.			County.	Average cost per mile.		
	Earth.	Macadam.	Brick.		Earth.	Macadam.	Brick.
Brooke.....	Dollars.	Dollars.	Dollars.	Marion.....	Dollars.	Dollars.	Dollars.
Cabell.....		8,000	15,000	Mercer.....		5,000	
Fayette.....		8,100		Mineral.....	875	10,000	
Greenbrier.....	750			Ohio.....		3,000	14,000
Harrison.....	600	2,750		Tyler.....		4,000	
Kanawha.....		8,000		Wood.....		3,500	
Lewis.....		4,800		Average.....	742	5,414	14,500
McDowell.....		(¹)					

¹ Macadam roads built with paid labor cost \$4,000 per mile, with convict labor, \$1,300 per mile.

WISCONSIN.

TABLE 88.—Mileage of public roads, 1909.

County.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
Adams.....	860			6	6	0.69
Ashland.....	420	5	16	1	22	5.23
Barron.....	1,300		6	7	13	1.00
Bayfield.....	530		30	20	50	9.43
Brown.....	900	38	270	5	313	34.77
Buffalo.....	900	5	17	12	34	3.77
Burnett.....	760		21	7	28	3.68
Calumet.....	600	13	410		423	70.50
Chippewa.....	1,140		23	9	32	2.80
Clark.....	1,300	2	28	5	35	2.69
Columbia.....	1,200	12	130	42	184	15.33
Crawford.....	790	1	11	4	16	2.02
Dane.....	1,920	47	260	12	319	16.61
Dodge.....	1,630	10	415	24	449	27.54
Door.....	900	39	155	5	199	22.11
Douglas.....	380	6		8	14	3.68
Dunn.....	1,300	33	10	35	46.33	3.56
Eau Claire.....	760	16	62	18	96	12.63
Florence.....	280	13	11	2	26	9.28
Fond du Lac.....	1,200	22	430	6	458	38.16
Forest.....	150		11	12	23	15.33
Grant.....	1,670	68	35	12	115	6.88
Green.....	960	23	22	18	63	6.56
Green Lake.....	450	2	65	7	74	16.44
Iowa.....	960		52	9	61	6.35
Iron.....	120	4	6	3	13	10.83
Jackson.....	1,010	3	32	55	90	8.91
Jefferson.....	940	9	235	33	277	29.57
Juneau.....	1,020		20	11	31	3.03
Kenosha.....	420	2	116		118	28.08
Kewaunee.....	560	6	216	7	229	40.89
La Crosse.....	570	55	22	32	109	19.12
Lafayette.....	1,010		54	7	61	6.03
Langlade.....	540		11	14	25	4.62
Lincoln.....	530	8	23	22	53	10.00
Manitowoc.....	1,190	11	350	16	377	31.68
Marathon.....	1,710	6	32	48	86	5.02
Marinette.....	590	1	70	16	87	14.74
Marquette.....	530		16	6	22	4.15
Milwaukee.....	470	21	208	3	232	49.36
Monroe.....	1,450	12	21	28	61	4.20
Oconto.....	850		155	12	167	19.64
Oneida.....	540					
Outagamie.....	980	6	230	23	259	26.42
Ozaukee.....	540	5	310	10	325	60.18
Pepin.....	370		11	6	17	4.59
Pierce.....	1,130	20	103	20	143	12.65
Polk.....	1,270		20	15	35	2.75
Portage.....	1,120	27	31	28	86	7.67
Price.....	550		25	16	41	7.45
Racine.....	580	13	225	6	244	42.06
Richland.....	830	3	38	20	61	7.34
Rock.....	1,160	32	280	10	322	27.75
Rusk.....	350		5	17	22	6.28
St. Croix.....	1,180	1	75	34	110	9.32
Sauk.....	1,360	33	6	26	65	4.77
Sawyer.....	310			6	6	1.93
Shawano.....	1,110	2	103	5	110	9.90
Sheboygan.....	900	10	640		650	72.22
Taylor.....	530		32	26	58	10.96
Trempealeau.....	1,000	7	37	40	84	8.40
Vernon.....	1,310	5	32	15	52	3.96
Vilas.....	130					
Walworth.....	790		340	18	358	45.31
Washburn.....	560		11	23	34	6.06
Washington.....	870	5	530		535	61.49
Waukesha.....	1,080	16	560		576	53.33
Waupaca.....	1,120		125	18	143	12.76
Waushara.....	930	1	61	7	69	7.41
Winnebago.....	790	10	575		585	74.05
Wood.....	930	3	12	24	39	4.19
Total.....	61,090	659.33	8,494	1,013	10,167.33	16.64

¹ Includes 1 mile of bituminous-macadam road.

TABLE 88.—*Mileage of public roads, 1909—Continued.*

RECAPITULATION.

Year.	Total mileage of all public roads.	Mileage of improved roads.				Approximate percentage of roads improved.
		Stone.	Gravel.	Sand-clay.	Total.	
1904.....	63,593	733.25	9,900	.....	10,633.25	16.72
1909.....	61,090	659.33	8,494	.....	10,167.33	16.64
Gain.....	.....	.....	.....	.....	1,013	.....

¹ Includes 1 mile of bituminous-macadam road.TABLE 89.—*Cost data, 1909.*

County and township.	Average cost per mile.			County and township.	Average cost per mile.		
	Sand-clay.	Gravel.	Macadam.		Sand-clay.	Gravel.	Macadam.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>		<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Ashland.....	898	2,286	Oconto townships—	.....	.....	.....
Clark.....	2,100	3,168	Con.:	.....	.....	.....
Dane.....	1,750	2,750	Fensaukee.....	.....	1,680	.....
Grant.....	2,560	Spruce.....	350	.....	.....
Green.....	2,000	Stiles.....	.....	320	.....
Jefferson.....	1,500	2,500	Portage.....	.....	.....	2,000
Kenosha.....	700	4,000	Price.....	1,250	.....	.....
Lincoln.....	800	.....	Richland.....	.....	500	2,050
Marinette.....	800	2,000	St. Croix.....	.....	250	.....
Monroe.....	2,000	Sauk.....	.....	1,600	2,600
Oconto townships:	Waukesha.....	.....	.....	5,800
Brazeau.....	1,000	.....	Average.....	800	1,135	2,978
Oconto city (South ward)	2,000	5,986				

WYOMING.

TABLE 90.—*Mileage of public roads, 1909.*

County. ¹	Total mileage of all public roads.	Total mileage of all roads improved.	Approximate percentage of roads improved.	County. ¹	Total mileage of all public roads.	Total mileage of all roads improved.	Approximate percentage of roads improved.
Albany.....	949	.....	.....	Sheridan.....	1,200	.....	.....
Bighorn.....	1,000	.....	.....	Sweetwater.....	420	.....	.....
Carbon.....	250	.....	.....	Uinta.....	1,000	.....	.....
Converse.....	600	.....	.....	Weston.....	250	.....	.....
Crook.....	396	.....	.....	Yellowstone National Park.....	416	2 416	100.00
Fremont.....	1,600	.....	.....	Total.....	10,569	2 416	3.94
Johnson.....	600	.....	.....		
Laramie.....	1,728	.....	.....		
Natrona.....	160	.....	.....		

RECAPITULATION.

Year.	Total mileage of all public roads.	Total mileage of all roads improved.	Approximate percentage of roads improved.
1904.....	10,447	3 153	1.46
1909.....	10,569	2 416	3.94
Gain.....	122	263	2.48

¹ Park County established from part of Bighorn County in 1909, but the organization did not become effective until 1911.² There are 416 miles of Government roads in the Yellowstone National Park and adjacent National Forests constructed and maintained by the National Government. These should be classified as improved roads, as most of them are surfaced with gravel, crushed stone, or selected soil.³ Includes improved gravel-macadam or gravel-telford roads in the Yellowstone National Park, many of which have telford or macadam foundations surfaced with gravel.

