

Approximately 225,000 acres of land for which little water is now available lie within a radius of 30 miles of the municipality. The surplus waters of the aqueduct will supply irrigation for 135,000 acres of this amount, allowing for the return of 2,000 miner's inches by seepage into the city's present infiltration galleries, provided the Fernando Valley is given irrigation.

Studies by the Los Angeles Water Department show that it requires the same amount of water to irrigate an acre of citrus trees that is required for an acre given up to urban population. The city, in its remarkable growth, is constantly encroaching on urban lands. The very nice problem enters of applying the water for irrigation in the localities which will gradually and insensibly grow from suburban into urban territory with the accompanying gradual transfer of the water from irrigation to domestic use.

For the past year a corps of engineers have been working on this problem. The irrigation system will therefore probably differ from the concrete canal systems found in California in that it will consist of large steel pressure mains ranging from 4 to 6 feet in diameter leading off from the Fernando reservoir to water the country below it. Probably the plan adopted by the United States Reclamation Service of forming irrigation districts will be put in force. In this event the districts will be required to defray the cost of all the work which will be installed by city engineers and become the property of the city. The actual cost to the irrigators has not been fixed, but the average annual rental for water in Southern California is approximately \$10 per acre.

With all the available water power developed and with the surplus water disposed of for irrigation, Mr. J. B. Lippincott, assistant chief engineer of the aqueduct, has computed that for a total expenditure of \$31,500,000 Los Angeles will receive a net annual income of \$4,425,000, which is the equivalent of 5 per cent. interest on \$88,500,000.

In conclusion, this project, now on the eve of completion, stands out clearly as the foremost municipal engineering achievement of history. It is an enterprise of which a nation might well be proud. In its large conception, its building by city forces, and its promise of large economic returns, this project certainly is one that is destined to have a very vital influence upon many other cities of America where the clamor for the ownership and operation of public utilities grows constantly louder.

OCTOBER RAILWAY TRAFFIC EXCEEDS ALL RECORDS.

The receipts and expenses of the steam railways for the month of October, 1912, are greater than for any other month in their history. Net operating revenue, which is the gross income before anything has been taken out for taxes and rentals, interest on bonds, appropriations for betterments or dividends, averaged \$15.71 per mile of line per day, which contrasts with \$13.74 for October, 1911, an increase of \$1.97. This is an increase per mile of line for the month of \$61.13, or 14.4 per cent.

The monthly summary of the Bureau of Railway Economics, compiled from the reports of railways to the Interstate Commerce Commission, covers for October 220,636 miles of line, or about 90 per cent. of all of the steam railway mileage of the United States. The aggregate net operating revenue for this mileage was \$107,440,518, which is greater by \$14,870,125 than that for October, 1911. The increases were due in greatest proportion to the freight traffic, which is always greater in October than in any other month of the year.

GOOD ROADS IN ALBERTA.*

By J. D. Robertson.†

The Local Improvement Organization, and works, done under this organization, have not, in all cases, been satisfactory. Many reasons have contributed to this, one being that the works facing such organizations were of such a character and magnitude that the funds at their disposal were not sufficient to cope with the situation. Another cause has been the fact that earth roads, when once built, in many parts of the Province require so much in the way of maintenance that little of value has been accomplished. The system of commuting taxes by labor has not, in my opinion, contributed much to the improvement of roads, but instead established a system which, while necessary in the new and sparsely settled districts, has frequently been continued after settlement was more dense, when vastly better work could have been accomplished by collecting the money and employing some capable man as foreman to conduct the work under the direction of the Council. The system of each Councillor having charge of the expenditure of all money in his particular division or township, regardless of main road requirements, without any comprehensive plan approved by the whole Council, has resulted in disconnected pieces of works here and there without much continuity of purpose.

Another matter might also be mentioned, which has not, in our opinion, contributed very largely to the improvement of roads, is the fact that the rate of assessment may be placed at anything from one and one-quarter cents to five cents per acre. We find certain districts, since their organization, assessing to the limit, while others, in which works are quite as necessary, assessing at the lowest figure, or very close to it. In other words, one man will pay \$8, local improvement taxes, on one quarter section, while perhaps his neighbor, who is using the same roads, is paying only \$2 per quarter section, which, to our mind, is certainly not just, and it is noted, in sections of the country where only the one and one-quarter cent per acre or \$2 per quarter is levied, they are quite as persistent in their requests for Government assistance as where they are assessing themselves to the limit. Under such conditions the Local Improvement Organization could not be expected to receive the hearty co-operation of the Department that it deserves. It is to be hoped that some of these difficulties and drawbacks will be removed under the Municipal Organization, where such is put in force, and also under the re-organization of Local Improvements Districts, where municipalities are not formed. It should be mentioned here that, while certain districts have been handicapped by the difficulties mentioned above, others have taken the best out of the Act, under which they are working, and have achieved very satisfactory results. In conducting work for the Government, on the improvement of roads, we are well aware of the many difficulties to be contended with, and it is to be hoped, when another year's work is begun, that we may have an even more hearty co-operation with the new organizations than it has been possible to have under the old regime. In most of the Province the building of permanent highways is still in the distance, and, for this reason, I am going to confine my remarks to the more primitive works.

Grading Earth Roads.—The fact should always be borne in mind that water from melting snow or ice and rain is the principal factor against which we have always

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